PROPOSED SPENDING PLAN FOR U.S. FISH AND WILDLIFE SERVICE COOPERATIVE AGREEMENT AWARD F17AC00042: "GULF STAR FUNDING TO SUPPORT LEVERAGED APPLICATION OF THE GULF COAST VULNERABILITY ASSESSMENT"

Community Resilience Priority Issue Team
Habitat Resources Priority Issue Team
Wildlife and Fisheries Priority Issue Team

25 May 2018

Introduction

The Gulf Coast Vulnerability Assessment (GCVA) was a project jointly pursued by the four Gulf Landscape Conservation Cooperatives (Gulf Coast Prairie, Gulf Coastal Plains & Ozarks, South Atlantic, and Peninsular Florida), two regional Climate Science Centers (South Central and Southeast), and the Gulf of Mexico Alliance (hereafter "the Alliance"). Numerous individuals representing a broad cross-section of Gulf agencies, organizations, and entities affiliated with these partnerships participated in the GCVA. This work culminated in a report (Watson et al. 2017) that spatially depicted vulnerabilities to climate change, urbanization, and sea level rise for 4 ecosystems (tidal emergent marsh, mangroves, oyster reefs, and barrier islands) and 11 associated species (blue crab, clapper rail, mottled duck, spotted seatrout, roseate spoonbill, eastern oyster, American oystercatcher, red drum, black skimmer, Kemp's ridley sea turtle, and Wilson's plover). For this work, the GCVA Team was awarded the U.S. Fish and Wildlife Service's (USFWS's) 2015 Sam D. Hamilton Award for Transformational Conservation Science. In addition to the recognition associated with this award came a $50,000 honorarium. In consultation with the GCVA Team, USFWS personnel decided that all expenditures of these dollars should support the broad goal of applying GCVA results towards development of a Gulf Coast Adaptation Plan (GCAP). Approximately half of the funds from the Hamilton Award have been made available to the Alliance to develop and implement a collaborative project through the Alliance's Gulf Star program that advances a GCAP through leveraged application of the GCVA.

Approach

This USFWS-funded project is premised on further developing the existing base framework of the GCVA to inform the eventual establishment of a Gulf Coast Adaptation Strategy. To develop a road map of analytical steps that would be necessary to achieve a GCAP from a GCVA starting point, the project will explore what the GCAP should look like analytically.

During its 2014 priorities re-assessment, the Alliance established a "Conservation, Restoration and Resilience Planning Cross-Team Initiative" (hereafter Planning CTI), intent on helping Gulf managers and stakeholders "… foster greater integration among planning aspects of restoration, conservation and resilience to increase the efficiency and effectiveness of on the ground efforts." As with all of the cross-team initiatives, the pursuit of those goals and conduct of contributing actions are the shared responsibility of multiple Alliance priority issue teams. The narrative describing the initiative identified the need to "[coordinate] existing conservation, restoration, and resiliency datasets to assist Gulf Stakeholders in the drafting of a comprehensive adaption and resilience plan." However, there has been little discussion of what a GCAP would or should be.

The broad representation of Gulf Coast stakeholders within the Alliance's membership represents the perfect opportunity to solicit ideas on the goals and objectives of a consensus-driven GCAP. The Alliance will use that input to develop a strategy of what steps are needed to move towards a GCAP. Through a series of Priority Issue Team meetings, the Alliance will develop an adaptive framework that identifies the data, tools, partners, and projects to employ in applying the GCVA and learn what would be useful for groups across the Gulf. The project team will endeavor to structure the GCAP as a living document that facilitates continuous improvement as lessons are learned and as data and tools are updated.

As part of that process, the Project Team will consider how a more quantitatively-based GCVA would compare to the existing document and how that could be achieved. Due to resource constraints, the estimations of both habitat and focal species vulnerabilities to climate change, urbanization, and sea level rise in Watson et al. (2017) were largely qualitative and based on the professional judgment of the subject matter experts. To allow the GCVA to better inform specific actions needed to underpin a GCAP, and perhaps to provide both a less arguable and more transparent basis for proposed actions, the Alliance has discussed incorporating existing or developing new quantitative data on habitat and focal species vulnerabilities, and human coastal community adaptation and resilience, to transition from the GCVA towards the GCAP.

Task 1: Alliance Mid-Year Meeting Discussions

The Alliance's Habitat Resources Priority Issue Team (HRT) and Wildlife and Fisheries Priority Issue Team (WFT) initiated conversations about the most appropriate quantitative datasets to pursue incorporating into the GCVA during their February 2018 mid-year team meetings. In doing so, the Alliance leveraged internal funding to the HRT and WFT to conduct the mid-year meetings and support this project.

Subtask 1.1: Wildlife and Fisheries Team Mid-Year Meeting

Given the WFT's purview and expertise of its members, the team is leading the investigation into analytical capabilities and datasets on the focal species component of the GCVA. With a familiarity of the existing science on predictive models for priority fish and wildlife species and a focus on being able to inform estimations of vulnerability of those species across the entirety of the U.S. Gulf Coast, the WFT has identified the USFWS's Biological Objectives Models (BOM) as the most relevant starting point. USFWS personnel presented information on the BOMs at the 2016 Alliance All-Hands Meeting in Baton Rouge, but at the end of 2017 the WRT was not familiar with what additional work has since been conducted on BOMs.

The WFT held their midyear team meeting on Wednesday, 7 February 2018, at the Hyatt Regency New Orleans, in New Orleans, Louisiana, coincident with the annual Gulf of Mexico Oil Spill and Ecosystem Science (GOMOSES) Conference. The agenda for that meeting is included as Attachment 1 of this document. The WFT invited Dr. James Cronin (USGS) to present the state-of-the-science regarding BOMs for Gulf Coast priority species. A leading sea-level rise (SLR) modeler, Jonathan Clough (Warren Pinnacle Consulting), also gave a presentation to inform participants of opportunities and advances in the Sea-Level Affecting Marshes Model (SLAMM). Those discussions informed the WFT on

- What species models have been completed?
- What species model development activities are ongoing or planned and budgeted for additional species?
- How do those species lists compare to the GCVA focal species?
- What habitat change data outputs are needed to drive BOMs?
- Could advances in habitat modeling change species predictions?

The conversation was intended to inform decisions on moving towards a GCAP with the existing qualitative species vulnerability approach in Watson et al. (2017) compared to the practicality of moving forward with a quantitative basis of fish and wildlife vulnerabilities, as represented by BOMs, and what additional resources and research & development actions would be necessary to provide a fuller list of species models. The February 2018 discussion left some relevant details unresolved, and accordingly the WFT intends to re-engage with DOI Biological Objectives Modelers in its June 2018 All-Hands Meeting sessions to further discuss the practicality of pursuing BOMs as the means of estimating species vulnerabilities within a tentative GCVA-GCAP strategy.

Subtask 1.2: Habitat Resources Team Mid-Year and All-Hands Meetings

Given the HRT's purview and expertise of its members, the team is leading the investigation into analytical capabilities and datasets on the habitat component of the GCVA. The HRT held their midyear team meeting on Thursday, 8 February 2018, also co-incident with the annual GOMOSES Conference. The agenda for that meeting is included as Attachment 2 of this document. The HRT began its investigation with the Sea Level Affecting Marshes Model (SLAMM) and the USGS Salt Marsh Inland Migration Model. To the team's knowledge, these are the only two analytical tools that can predict habitat change in response to climate drivers such as sea level rise across the entirety of the U.S. Gulf Coast. Other platforms such as NOAA's Ecological Effects of Sea Level Rise (EESLR) model suite and the State of Louisiana's Coastal Master Plan (LACMP) modeling suite are available and provide more robust predictions of change at subregional scales, but neither is capable at this time of informing vulnerabilities across the full U.S. Gulf Coast.

The HRT has a long working history with SLAMM. The predecessor of the HRT, the Alliance's Habitat Conservation and Restoration Priority Issue Team, worked both individually and in conjunction with the Coastal Community Resilience Priority Issue Team (now the CRT) to commission a large number of individual modeling activities for modeling domains across the Gulf to inform discussions of human and natural community changes to sea level rise. More recently, members of the HRT advised the Gulf Coast Prairie Landscape Conservation Cooperative (GCP LLC) on a project that ultimately resulted in a SLAMM analysis of the full U.S. Gulf Coast from Brownsville, Texas, to Key West, Florida. However, the GCP LLC SLAMM analysis did not engage the full extent of the platform's analytical capacity that existed at the time due to cost limitations. As well, the primary SLAMM developer, Jonathan Clough of Warren Pinnacle Consulting in Vermont, has continued to make incremental changes to SLAMM analytical capacities that are relevant to the needs of Gulf stakeholders and resource managers, such as the ability to input restoration projects into the model grid (Clough et al. 2017).

The HRT also has a working history with the USGS migration model. Several of the HRT's steering committee members were on a project advisory committee that informed and reviewed the development of the model, which was likewise commissioned by the GCP LLC.

The HRT invited Mr. Clough and Dr. Nicholas Enwright (USGS) to its mid-year meeting to present on the current capacity of the SLAMM platform and marsh migration model, respectively. Those discussions informed the HRT on

- What data outputs are provided by the two models, and how do they correspond to the data input needs of the BOMs discussed during the WFT meeting?

- What datasets exist from the current inventory of model runs from the two models?
- Are new model runs needed, and if so what costs/time would be needed for either of the two models to inform a revised GCVA and/or a GCAP?

The conversation informed the HRT on moving towards a GCAP with the existing qualitative habitat vulnerability approach in Watson et al. (2017) compared to the practicality of developing predictive data from the SLAMM and/or USGS platform, or others, to increase the quantification of Gulf Coast habitat vulnerabilities, whether existing datasets could serve that purpose or new analyses would be needed, and what time and funding resources would be required and thus incorporated into a GCAP strategy document.

The HRT expects that similar questions may need to be asked about the EESLR and LACMP modeling platforms before the team is in a position to recommend to the Alliance a path forward. Those conversations are planned for the Alliance's 2018 All Hands Meeting, and are described below.

Task 2: Project Deliberations during the Alliance All-Hands Meeting

Subtask 2.1. Discussions Regarding Focal Species Models during the WFT Working Session on Gulf Coast Vulnerability Assessment

The WFT will hold a ¼-day (1 ½ hours) session during its team meeting at the Alliance All-Hands Meeting to follow up on the February discussions on the focal species modeling. The session will largely mirror that from the February midyear meeting since different team members will participate, with an overview of the GCVA, GOMA's charge from DOI, and the USGS biological objectives models (BOM) followed by open discussion. The team will gain the benefit of additional team member perspectives and further insights on the BOMs as an option for incorporating fish and wildlife species vulnerabilities into an eventual GCAP. The draft agenda for that working session is included as Attachment 3 of this document.

Subtask 2.2. Discussions Regarding Sea Level Rise Models during the HRT/WFT Joint Sea Level Rise Session

The HRT and WFT will jointly hold a ¼-day (1 ½ hours) discussion on its Sea Level Rise Focal Area Session at the Alliance All-Hands Meeting in St. Petersburg, Florida. The teams have invited Drs. Scott Hagen (LSU) and Eric White (The Water Institute of the Gulf) with the EESLR and LACMP modeling teams, respectively, and will provide at least partial travel support with funding from this award, for presentations on the modeling platform capacities and input and output datasets, similar to that planned for the SLAMM and USGS models at the HRT Mid-Year Meeting. The draft agenda for that working session is included as Attachment 4 of this document.

Subtask 2.3. Urbanization Modeling Discussion during the Planning Cross-Team Initiative Session

Similar to the activities outlined in Subtasks 2.1 and 2.2 that will look at habitat and focal species modeling, the Alliance will also use the Planning CTI session to revisit the urban growth modeling conducted for the GCVA. That modeling was conducted by Dr. Adam Terando and others at North Carolina State University, and is documented in Terando et al. (2014). The CRT will invite Dr. Terando to present on the SLEUTH model and will support his travel costs from the project budget. That discussion will provide the project team and Planning CTI meeting attendees

- A summary on the SLEUTH modeling outlined in Terando et al. (2014) and incorporated into the current GCVA, and
- Progress on the SLEUTH modeling platform since the work outlined in Terando et al. (2014).

Those conversations are intended to inform the viability of retaining the existing SLEUTH modeling in the GCVA moving forward or whether updated or otherwise additional model runs are necessary. The decisions on those points will be incorporated into the strategy towards a GCAP as it is drafted by the Alliance. The draft agenda for that working session is included as Attachment 5 of this document

Subtask 2.4. Discussions Regarding Gulf Coast Adaptation Strategy Goals, Objectives and Structure during the Planning Cross-Team Initiative Session

As mentioned above, there has been little progress made by Gulf stakeholders as a whole towards defining the goals, objectives, and structure of a GCAP. The Alliance will devote a full, 3-hour afternoon discussion during its annual All-Hands Meeting on Thursday, 14 June 2018 in St. Petersburg, Florida to the Planning CTI. The CRT, HRT and WFT are planning to reserve an hour of that conversation for the solicitation of ideas from meeting attendees about what a GCAP should include and how the effort should be structured (see Attachment 5).

After the meeting the Alliance will draft the goals, objectives and structure of a GCAP based on that conversation. The document will be circulated for review to the full membership of the three priority issue teams and revised based on received comments. With this framework for a GCAP, the Alliance will be in a better position to develop the initial road map of how to get from the existing GCVA to a more comprehensive GCAP.

Task 3: HRT Workshop on Sea Level Rise Data and Modeling

Sea level rise is anticipated to be one of the principal drivers of habitat change along the U.S. Gulf Coast through the end of the century, and will also have a profound effect on the priority species. The HRT was already planning to conduct a one-day workshop during the summer of 2018, in coordination with the NOAA Northern Gulf of Mexico Sentinel Site Cooperative, to assemble a group of experts on the phenomenon of sea level rise in the U.S. Gulf Coast and the available data on the topic. That workshop will be supported through 2017-2018 Gulf Star funding available to the HRT. The goal of the workshop will be to inform the HRT Steering Committee and the Gulf-wide Scenarios Working Group's deliberations on the development of recommended scenarios for sea level rise modeling for both risk assessment and project design purposes.

Funds provided by this GCVA award will be used to add a second day to the agenda of the sea level rise data workshop that will provide a discussion of sea level rise models, and both qualify and quantify differences among model analytical capabilities and outputs. Several predictive modeling platforms have been used around the U.S. Gulf Coast to estimate spatial and temporal patterns of habitat loss in response to particular sea level rise scenarios. These include the EESLR and LACMP modeling suites and the SLAMM and USGS Marsh Migration models.

The Alliance anticipates discussions of differential analytical capabilities among the predominant models used along the U.S. Gulf Coast by the respective modelers, and a discussion of initial model output data comparisons currently being conducted by NOAA NCCOS personnel in Beaufort, North Carolina. These discussions will inform deliberations by members of the CRT, HRT and WFT steering committees on the preferred path forward regarding the quantification of vulnerability of critical habitats and human infrastructure. Project funds will be used to support the travel of modeling meeting presenters and key members of the CRT, HRT and WFT.

The Alliance Workshop on Gulf Sea Level Rise Data and Modeling is scheduled for 7-9 August 2018 at the Gulf Coast Research Laboratory's Marine Education Center in Ocean Springs, Mississippi. The agenda for the meeting is still being finalized, but a draft agenda is included as Attachment 6.

Task 4: Final Project Report

The Alliance will summarize the Task 2 discussions outlined above into a final report that will then synthesize that material to recommend the goals and objectives and structure of a Gulf Coast Adaptation Plan. The discussions in Tasks 1 and 3 will inform a recommendation of whether the more qualitative, subject-matter expert-driven assessments in the existing Gulf Coast Vulnerability Assessment should be replaced with quantitative predictions of habitat and species vulnerabilities. If so, the report will outline a strategy for the development and incorporation of that material into a revised assessment that will underpin a future Gulf Coast Adaptation Plan.

A draft final report will be communicated to USFWS Project Officer for a two-week agency review. Comments will be returned to the Alliance Project Officer at the end of those two weeks, and the Alliance Project Team will have two weeks to revise the report or otherwise respond to the received comments before communicating a revised, final report to the USFWS Project Officer. Preparation, review and revision of the draft report will be consistent with the Milestone Schedule below.

Literature Cited

Clough, J., M. Propato and A. Polaczyk. 2017. Evaluating Costs and Benefits of Marsh-Management Strategies Given Uncertain SLR and Ecosystem Response. Oral Presentation at the 24th Biennial Conference of the Coastal and Estuarine Research Federation, Providence, RI, 5-9 November 2017.

Gulf of Mexico Alliance. 2016. Governors' Action Plan III for Healthy and Resilient Coasts. 40 pages. Available at http://www.gulfofmexicoalliance.org/documents/APIII.pdf

Terando A.J., J. Costanza, C. Belyea, R.R. Dunn, A. McKerrow, and J.A. Collazo. 2014. The Southern Megalopolis: Using the Past to Predict the Future of Urban Sprawl in the Southeast U.S. PLoS ONE 9(7): e102261. https://doi.org/10.1371/journal.pone.0102261

Watson, A., J. Reece, B. E. Tirpak, C. K. Edwards, L. Geselbracht, M. Woodrey, M. K. La Peyre, and P. S. Dalyander. 2017. The Gulf Coast Vulnerability Assessment: Mangrove, Tidal Emergent Marsh, Barrier Islands, and Oyster Reef. Forest and Wildlife Research Center, Research Bulletin WFA421, Mississippi State University. 100 pp. Available at http://www.fwrc.msstate.edu/pubs/Gulf_Coast_Vulnerability_Assessment.pdf

Milestone Schedule
Activities shown in red have been completed

Date	*Activity*
7 February 2018	Subtask 1.1. Wildlife & Fisheries Priority Issue Team Mid-Year Meeting, New Orleans, Louisiana
8 February 2018	Subtask 1.2. Habitat Resources Priority Issue Team Mid-Year Meeting, New Orleans, Louisiana
14 June 2018	Task 2 Working Sessions at Alliance All-Hands Meeting, St. Petersburg, Florida
7-9 August 2018	Task 3 Joint Team Sea Level Rise Data and Modeling Workshop, Ocean Springs, MS
24 August 2018	Alliance submits Task 4 Draft Final Report to DOI for review and comments
7 September 2018	DOI communicates review and comments to the Alliance for Task 4 Draft Final Report for revision
21 September 2018	Alliance submits Task 4 Final Report to DOI
Week of 24 September 2018	Alliance Task 4 project close-out web seminar

ATTACHMENT 1

GOMA Wildlife & Fisheries Team Midyear Meeting

February 7, 2018, 9:00 am to 4:30 pm CST

New Orleans Hyatt Regency Hotel, 601 Loyola Ave, New Orleans, LA

Agenda

SCHEDULE	DESCRIPTION	LEADING
9:00 – 9:10	**Welcome and Agenda Overview**	**Robin Riechers**, WFT Chair
9:10 – 9:20	**Quick Review of Team Action Plan and Projects**	**Mike Smith**, WFT Coordinator
9:20 – 9:50	**Abt Assoc Nekton Utilization GS17 project** Project leader provides overview of this project, which will have just begun in January and allow time for discussion.	**Terill Hollweg**, Principal Investigator
9:50 – 10:00	**The Strategic Conservation Assessment Project** $1.9 million/3 year project funded by the Restore Council to identify stakeholder ecological and socioeconomic priorities for land conservation along the Gulf coast.	**Jennifer Roberts**, SCA Coordinator
10:00 – 10:30	**BREAK** (Storyville Hall, 3rd floor)	
10:30 – 11:30	**GOMA DOI Contract: Strategy for Moving the Gulf Coast Vulnerability Assessment Forward** Discussion of developing a Gulf Coast Adaptation Strategy based on the GCVA in collaboration with DOI, GOMA HRT, GOMA CRT, and GOMA WFT. DOI has awarded GOMA $24,830 to move the GCVA forward. This will be a first conversation that we anticipate continuing at All Hands.	*Session Facilitator:* **Tracie Sempier** *Panelists:* **Robin Riechers**, Chair **John Tirpak**, FWS **James Cronin**, USGS **Jonathan Clough**, Warren Pinnacle Consulting **Jim Pahl**, GOMA HRT Chair
11:30 – 12:45	**LUNCH** (provided at 8 Block Kitchen & Bar, 3rd floor)	

GOMA Wildlife & Fisheries Team Midyear Meeting Agenda (*continued*)

SCHEDULE	DESCRIPTION	LEADING
12:45 – 1:00	**Audubon G.U.L.F Program – Sustainable Fisheries for the Gulf** Overview and discussion of an active program that engages restaurants as well as harvesters, processors, and distributors to partner toward sustainable fisheries.	**Laura Picariello**, G.U.L.F. Coordinator **John Fallon**, Director of Sustainability and Coastal Conservation Initiatives, Audubon
1:00 – 2:30	**NAS Capacity-Building Award: Industry Engagement in GOMA** *Our Team's Charge Under the Award* *Commercial Fishing Panel and Open Discussion* Panelists will share their perspective and experiences on fisheries stewardship and how to engage others in their industry on that subject. Topics include utilization of bycatch but the goal is to learn what industry is doing and explore where we could collaborate. *Outreach Engagement Plan* Outline the industries we intend to engage and how we will accomplish that, identifying individuals to contact and a timeline for engagement, including industry invitations to All Hands.	*Session Facilitator:* **Christina Mohrman** *Panelists:* **Lance Nacio**, Principal, Anna Marie Shrimp **Acy Cooper, Jr.,** President, LA Shrimp Association
2:30 – 3:00	**2018 GOMA All Hands Team Agenda** Discuss agenda items and cross team possibilities with the team as a whole.	**Robin Riechers**, WTF Chair **Mark Lingo**, WFT Co-Chair
3:00 – 3:30	**WFT Tier 2 Workplan Review and Planning** Discuss/develop strategy for prioritizing Tier 2 actions and for documenting project ideas, and how to refine and utilize the Tier 2 work plan overall.	**Mike Smith**
3:30 – 4:00	**BREAK** (Storyville Hall, 3rd floor)	
4:00 – 4:30	**Wrap up and invitation to All Hands** Revisit the All Hands agenda in light of the Tier 2 discussion. Review the day and identify next steps.	**Robin Riechers**

ATTACHMENT 2

Habitat Resources Team Mid-Year Agenda
Hyatt Regency New Orleans, Celestin B Ballroom
Thursday, 8 February 2018

Date/Time	Topic and Discussion Leads
1:00 – 1:30 pm	**Welcome and Introductions** *James Pahl, Louisiana Coastal Protection and Restoration Authority*
1:30 – 2:00 pm	**Habitat Assessment** *Emma Clarkson, Texas Parks and Wildlife Department* *Kate Spear, U.S. Geological Survey* • **Review of Tier 2 Work Plan and Status on Gulf Star Projects** • **Plans for All-Hands – Possible Joint Session with Data & Monitoring?** • **General Discussion on the Topic**
2:00 – 2:30 pm	**Living Shorelines** *Rene Baumstark, Florida Fish and Wildlife Conservation Commission* • **Review of Tier 2 Work Plan and Status on Gulf Star Projects** • **Plans for All-Hands – Joint Session with Data & Monitoring?** • **General Discussion on the Topic**
2:30 – 3:00 pm	**Regional Sediment Management** *Ray Newby, Texas General Land Office* *Mike Miner, Bureau of Ocean Energy Management* • **Review of Tier 2 Work Plan and Status on Gulf Star Projects** • **Plans for All-Hands** • **General Discussion on the Topic**
3:00 – 3:30 pm	**Ecosystem Services Cross-Team Initiative** *Becky Allee, NOAA* • **Review of Tier 2 Work Plan and Status on Gulf Star Projects** • **Plans for All-Hands** • **General Discussion on the Topic**
3:30 – 4:00 pm	**GOMOSES Coffee Break** *Storyville Hall*

Habitat Resources Team Mid-Year Agenda (*continued*)

Date/Time	Topic and Discussion Leads

4:00 – 5:00 pm	**Combined Discussion of Sea Level Rise and the Comprehensive Planning Cross-Team Initiative**
	James Pahl
	George Ramseur, Mississippi Department of Marine Resources
	Heather Young, RESTORE Council
	• **Review of Tier 2 Work Plan and Status on Gulf Star Projects**
	• **GCVA Project Discussion**
	• **Sea Level Rise Model Discussion**
	  ○ **Update on SLAMM Capacities**
	  Jonathan Clough, Warren Pinnacle Consulting
	  ○ **Update on Saltmarsh Inland Migration Model**
	  Nicholas Enwright, USGS
	• **Plans for All-Hands**
	• **General Discussion on the Topic**

5:00 – 5:30 pm	**Further Discussion and Meeting Wrap-Up** *James Pahl*

ATTACHMENT 3

Gulf of Mexico Alliance All-Hands Meeting
Wildlife and Fisheries Priority Issue Team Meeting

Hilton St. Petersburg Bayfront Hotel
333 1st St SE, St. Petersburg, Florida

Thursday Morning, 14 June 2018

Agenda

Date/Time	Speaker/Discussion Lead
Wildlife and Fisheries Priority Issue Team Meeting *Harborview/Pier/Skyway Rooms*	
	Working Session on Gulf Coast Vulnerability Assessment (GCVA)
8:30 – 8:40 am	Introductions and Objectives for the Session *Robin Riechers, WFT Chair, TX Parks & Wildlife Dept.*
8:40 – 8:55 am	GOMA DOI Contract: Strategy for Moving the GCVA Forward *John Tirpak, U.S. Fish & Wildlife Service*
8:55 – 9:05 am	Biological Objective Models: Establishing Explicit Biological Objectives to Guide Strategic Habitat Conservation for the Gulf Coast *James Cronin, U.S. Geological Survey*
9:05 – 10:00 am	Input Session and Open Discussion
10:00 am	Adjourn Working Session

ATTACHMENT 4

Gulf of Mexico Alliance All-Hands Meeting

Hilton St. Petersburg Bayfront Hotel
333 1st St SE, St. Petersburg, Florida

Thursday Morning, 14 June 2018

Date/Time	Speaker/Discussion Lead

Habitat Resources Priority Issue Team Joint Working Session with the Wildlife and Fisheries Priority Issue Team: Sea Level Rise
St. Petersburg Ballroom 2

10:30 – 10:40 am	Introduction to the Session *James Pahl, Louisiana Coastal Protection and Restoration Authority* *George Ramseur, Mississippi Department of Marine Resources*
10:40 – 11:00 am	Sea Level Rise Data and Modeling Workshop *Renee Collini, Dauphin Island Sea Lab*
11:00 – 11:20 am	NOAA's Ecological Effects of Sea Level Rise Model *Scott Hagen, Louisiana State University*
11:20 – 11:40 am	Louisiana's Coastal Master Plan Modeling Suite *Eric White, The Water Institute of the Gulf*
11:40 am – noon	Open Discussion *James Pahl*
Noon	Adjourn Working Session

ATTACHMENT 5

Gulf of Mexico Alliance All-Hands Meeting

Hilton St. Petersburg Bayfront Hotel
333 1st St SE, St. Petersburg, Florida

Thursday Afternoon, 14 June 2018

Date/Time	Topic and Speaker/Discussion Lead

Comprehensive Planning Cross-Team Initiative Meeting

St. Petersburg Ballroom 2-3

1:30 – 1:45 pm	Welcome and Introductions *James Pahl* *Rhonda Price, Mississippi Department of Marine Resources* *Robin Riechers, Texas Parks & Wildlife Department* *Marian Hanisko and Heidi Stiller, NOAA Office of Coastal Management*
1:45 – 2:00 pm	Gulf Coast Vulnerability Assessment *John Tirpak, US Fish & Wildlife Service*
2:00 – 2:15 pm	DOI-Funded Project on the Gulf Coast Vulnerability Assessment, and Discussion of Input Session *James Pahl*
2:15 – 2:45 pm	Past Application of the SLEUTH Modeling Platform to the Gulf Coast Vulnerability Assessment and Current Model Status *Adam Terando, US Geological Survey*
2:45 – 3:15 pm	Louisiana-Mississippi-Alabama Coastal System *George Ramseur*
3:15 – 3:45 pm	***Coffee Break, Exhibit Viewing and Networking*** *Regency Ballroom D*
3:45 – 4:00 pm	Instructions for Roving Flipchart Activity *Marian Hanisko*
4:00 – 5:15 pm	Gulf Coast Adaptation Plan Input Session *Multiple facilitated break-out groups*
5:15 – 5:30 pm	Next Steps and Closing Comments *TBD Input Session Facilitators* *James Pahl, Rhonda Price and Robin Riechers*
5:30 pm	Adjourn Comprehensive Planning Session

ATTACHMENT 6

Gulf of Mexico Alliance

Northern Gulf of Mexico Sea-Level Rise Data & Modeling Workshop

Gulf Coast Research Laboratory Marine Education Center
101 Sweet Bay Drive, Ocean Springs, Mississippi

7-9 August 2018

AGENDA

Tuesday Afternoon, 7 August 2018

Date/Time	Topic and Speaker/Discussion Lead
1:00 – 5:30 pm	Sea Level Rise Data and Scenarios
5:30 pm	Adjourn Sea Level Rise Data and Scenarios Session for the Day

Wednesday, 8 August 2018

Date/Time	Topic and Speaker/Discussion Lead
8:30 am – noon	Sea Level Rise Data and Scenarios (continued)
Noon	Adjourn Sea Level Rise Data and Scenarios Session
Noon – 1:00 pm	Lunch
1:00 – 5:30 pm	Sea Level Rise-Driven Habitat Change Modeling
5:30 pm	Adjourn Sea Level Rise-Driven Habitat Change Modeling Session for the Day

Thursday, 9 August 2018

Date/Time	Topic and Speaker/Discussion Lead
8:30 am – noon	Sea Level Rise-Driven Habitat Change Modeling (continued)
Noon	Adjourn Sea Level Rise-Driven Habitat Change Modeling Session

Louisiana, Mississippi, Alabama Coastal System (LMACS), Draft Development Plan

Alabama Department of Conservation and Natural Resources (ADCNR), Carl Ferraro
Louisiana Coastal Protection and Restoration Authority (CPRA), Jim Pahl
Mississippi Department of Marine Resources (MDMR), George Ramseur
Gulf of Mexico Alliance (GOMA)
Produced by MDMR, Office of Coastal Restoration and Resiliency, May 2018.

I. Introduction

The LMACS (included map) is a multi-state planning area that is defined by functional and hydrogeomorphic characteristics of a shared coastal estuary. The broad goals of LMACS are to provide a spatial platform to support the development of a comprehensive restoration master plan and to coordinate restoration and management resources and actions between the three adjoining central Gulf states.

Mississippi's restoration needs have significantly influenced the LMACS concept. Specifically, restoring water quality (including historic ranges, variabilities, and ecosystem buffering capacities) is critical to sustaining the goal of Governor Bryant's 2015 Oyster Report, which is "to produce 1 million sacks of oysters a year by 2025." In context, Mississippi's oyster production has slipped drastically since its heyday in the first half of the 1900s when "million sack" or greater annual harvests were commonplace.

Ecologically, oysters often seem enigmatic, with many variable and overlapping factors affecting their health and productivity. Therefore, identifying trends in the estuarine system that may have contributed to their overall decline is difficult. Water quality monitoring was limited during our oyster heyday therefore biochemical and other environmental changes must largely be interpolated.

Some of the most readily observable changes in the LMACS are geomorphic, owing to improved mapping available after about 1850. These changes include comprehensive erosion of barrier marsh and island complexes with a commensurate increase in tidal exchange which has been additionally modified by extensive navigation channel and port development. These changes are known to increase marine conditions in interior bays (Schindler, 2010) and are demonstrated in the LMACS by a trending increase of marine species in MDMR finfish surveys (Mickle et al. 2018). This suggests that restoring historic water quality and estuarine conditions will require large-scale geomorphic restoration coordinated across the entire multi- state system. Restoration of this type and scale should also provide significant progress toward long term coastal protection and resiliency goals for coastal communities.

II. Organizational Components

1. Data Inventory and Compilation – Select for potential utility in designing and prioritizing large scale, strategic, system-based geomorphic restoration. Data coverage will include the LMACS plus anticipated modeling domain (e.g. coastal Gulf of Mexico, HUCs 031601, 031602,031700, 031800). Data types will include hydrogeomorphic – historic, current, and projected bathymetry and topography; and ecological – salinity, dissolved oxygen, nutrients, chlorophyll, larval transport, etc.

2. Modeling – Gain a comprehensive understanding of the basic mechanics of the LMACS, how it has changed over time, and how it is anticipated to change in the future through at least two sea level rise scenarios (matching those selected for the Louisiana Master Plan to ensure continuity between the two efforts).

3. Planning – Undertaken as the long-term dynamics and potential future trajectories are better defined by the data and modeling process. Economics will be modeled to inform ecosystem services and resiliency / physical protection for coastal communities.

III. Hydrodynamic Modeling Scenarios

Hydrodynamic modeling will be needed to fully assess the impact of these changes. The model(s) selected should be effective across the entire LMACS planning area and should be capable of interfacing with existing models to achieve adequate, system wide coverage in the most efficient manner possible. The model(s) should couple hydrodynamic and ecological factors and should support the development of at least four simulations to include historic, current and two future sea level rise scenarios.

1. Historic - Simulation timeframe will be selected based upon data quality and abundance to include:
    a. bathymetry / charts;
    b. water quality for watershed, estuarine basin and coastal ocean;
    c. meteorology; and
    d. fisheries production and biology
    e. aquatic community dynamics
    f. shell mass, diversity/structure and distribution

2. Current - Simulations will include the most recent, sufficiently detailed geomorphic data and other data needed to illustrate the evolution of the system throughout the period of the historic simulation. Some information, such as the apparent regional distribution of hypoxia east of the Mississippi River, has developed recently and may be difficult to hindcast.

3,4. Future - Simulations will match Louisiana Master Plan sea level rise scenarios

IV. Informing Model inputs or Relying on Model Outputs

The overarching goal of this hydrodynamic modeling effort is to understand the "mechanics of the system". This means quantifying the effects of natural and human-induced geomorphic changes in the system as they pertain to circulation, mixing and energy dynamics, and ecological processes. Some potential initial objectives:

- Assess the historic scenario (1) and identified historic trends to improve selection of desired future conditions, particularly for oyster production. In other words, let the highly productive conditions of the past inform the selection of desired future conditions and the restoration or management actions to achieve them.
- Quantify circulation throughout the water column, particularly flow behavior through the ocean/ estuarine barrier tidal inlets along with major navigation channels and port/ infrastructure modifications to the system (i.e. Port of Pascagoula v Pascagoula River).
- Assess ecosystem buffering capacity of current and future scenarios to natural (direct meteorological i.e. winds, storms, precipitation) and human induced (indirect meteorological, i.e. Bonnet Carré spillway openings).
- Determine the economic or other viability of strategic geomorphic scale creation (manipulation using constructed habitats, landforms, etc. that are sited without direct historical reference). This could involve the creation of islands or shoals to achieve hydrodynamic objectives, storm protection / resiliency benefits, etc.

- Assess the performance of the estuarine barrier and overall tidal prism with focus on flow dynamics of the tidal inlets through Biloxi Marsh and the Gulf Islands. This would include reconstructing historic inlet cross-sections and regional bathymetries to see if geomorphic restoration in these areas can restore functions. An example project consideration might be to use sourced sand to restore or enhance tidal deltas in order to modify flow and mixing of coastal ocean and estuarine waters through the tidal channels.
- Model the behavior of potential restoration/ management actions and prioritize based upon function, economics, constructability, etc.

V. Notes/ Questions

What are the major points of information or observations that have shaped this concept?
The steady erosion of oyster production and apparent loss of resiliency to environmental stressors like Bonnet Carre spillway openings is a primary driver. Also, the ongoing master planning process in Louisiana has yielded a variety of projects with potential impacts (positive and negative) for Mississippi. This has encouraged increasing dialogue with a more system wide focus.
Specific points include:

- *The overarching goals presented by the Governor's Oyster Council, Restoration & Resiliency Final Report (June 2015)*
- *Operation of flood control mechanisms on the Mississippi River (Bonnet Carre, etc.)*
- *Modifications to freshwater inflows in the primary LMACS watersheds*
- *Modifications to flows, distributions, biochemistry and other factors within the LMACS by infrastructure projects particularly navigation dredging.*
- *Long term erosion, particularly of the primary LMACS estuarine barrier (Biloxi Marsh, Gulf Island nation Seashore, Dauphin Island).*
- *System wide estuarine benefits to support and sustain traditional fisheries.*
- *Loss of shell mass, reef diversity and distribution*

Why model a historic scenario?
Prior conditions are often considered in modeling projects. However, the complexity of determining the desired future water quality conditions for oyster production suggests that we look at a time when production was known to be in the range of our current goals to see if basic systemic changes can be identified and potentially translated into restoration actions.

How and where is this effort being coordinated?
The concept that eventually became the LMACS was presented at the GOMA All Hands Meeting in 2017 by George Ramseur and Heather Young. The first presentation specifically describing the LMACS was given by George at the Southeastern Legislative Conference in Gulfport, Ms. In August of 2017. Since that time the effort has coordinated largely among GOMA Habitat Resources Team members and with GOMA and MDMR leadership. It has involved considerable outreach in the form of conference presentations, academic lectures, personal communications and conference calls with a broad range of government and non-government agencies, institutions of higher learning. In terms of where LMACS will be coordinated, much of that should be determined at the 2018 GOMA All Hands Meeting which is viewed as a major opportunity to further the integration of LMACS into GOMA and align the effort with existing efforts and resources both in and outside of GOMA.

What are the respective state roles?
As a predominantly GOMA initiative, the goal is that the roles of the respective states are fully equal and interchangeable:

- *Mississippi is acting as the key stakeholder because it's entire estuary is encompassed by the LMACS and is therefore affected by the physical and political interactions that occur throughout the greater system. In this*

context, Mississippi has the most to gain or lose depending on the future health and ecological trajectory of the system.

- *Louisiana has significant influence due to its acute, large scale restoration needs to which it has responded over the last decade with advanced science and planning processes that provide a strong template for addressing issues throughout the LMACS.*
- *Alabama is similar to Mississippi in its overall development of assessment and comprehensive planning and has historically worked with Mississippi to evaluate restoration concepts and potential actions that could have significant effects for each state.*

What makes LMACS different than the multiple current restoration plans (will it interfere with ongoing plans)?
We're not aware of any other effort that is prioritizing a multi-state, comprehensive, system-based approach to support restoration at a scale needed to address the fundamental threats to this multi-state estuary. This includes a primary focus on what Louisiana has referred to as the "governance". That is, managing the social elements of communication and coordination that become more complex when the political, financial and technical aspects of comprehensive restoration extend beyond agency jurisdictions and state boundaries. Governance is key to leveraging the combined resources and expertise of the stakeholder states, agencies, NGOs and IHLs. The network that GOMA provides is ideal for this task and is why GOMA is intended as the organizational platform for the LMACS.
Some efforts that currently overlap or have the potential to overlap the LMACS in either a spatial or scientific manner include the Gulf Coast Vulnerability Assessment (GCVA), RESTORE and a broad range of ongoing research and monitoring efforts by USGS, BOEM, USACE and state entities. The intent of this effort is to support and utilize existing work wherever possible.

Does the LMACS plan provide opportunity for regional resources to be pooled for large scale projects?
The intent of the LMACS concept is support and utilize existing work wherever possible. This approach has arisen from a decade of multi-state communication and coordination supported by GOMA which is dedicated to cooperation and resource pooling at a Gulf of Mexico scale. GOMA supports an array of priority teams that already engage a broad cross section of the resources needed to develop the LMACS concept. For example, the current Monitoring Community of Practice (MCoP) may provide an impetus and structure for the LMACS "Data and Inventory" component listed earlier in this document (Section II.,1.). Complete funding has not been determined for any aspect of this process. It is anticipated that funding will be collaborative. The LMACS was developed and has been sustained to this point by staff time and limited travel and support funding furnished by the states of Louisiana, Mississippi and Alabama along with GOMA.

The Louisiana, Mississippi, Alabama Coastal System (LMACS)
Coastal Estuarine Restoration and Resiliency Planning Area
N
40 mi
Google earth

GULF COAST VULNERABILITY ASSESSMENT

11/1/2015

Executive Summary

The Gulf Coast Vulnerability Assessment (GCVA) is a collaborative effort to evaluate the vulnerability of four key ecosystems and 11 associated species to the effects of climate change, sea level rise, and land use change across the U.S. portion of the Gulf of Mexico.

Gulf Coast Vulnerability Assessment

EXECUTIVE SUMMARY

The Gulf Coast Vulnerability Assessment (GCVA or "Assessment") is a collaborative effort to evaluate the vulnerability of four key ecosystems and eleven associated species to the effects of climate change, sea level rise, and land use change across the U.S. portion of the Gulf of Mexico. It is designed to inform land managers, researchers, and decision makers about the relative vulnerability across individual species and ecosystems and how that vulnerability varies spatially across the Gulf region for each.

The GCVA is a qualitative assessment that compiles the expert opinions of managers, scientists, administrators, and others. The results presented herein represent informed opinions of the experts engaged, and as such, they reflect individual experiences, values, and perspectives. With an understanding of these limitations, these results are extremely useful in helping identify the relative vulnerabilities of ecosystems and species in different areas of the Gulf Coast, as well as across taxa and habitat types. One anticipated application of this information is in project and proposal review, as a means to identify vulnerable resources that may require a greater level of scrutiny to ensure sustainability. Similarly, using this information to broadly evaluate where increased conservation effort should be directed to reduce vulnerabilities (i.e. adaptation) is another intended use of these results. From a research perspective, high variability in assessors' individual scores for specific aspects of the assessment help identify where uncertainties exist that should be the target of further investigation. The authors caution that these results should not be applied at scales below the subregion without careful consideration.

This was a team effort led to completion by a Core Planning Team coordinated by Amanda Watson. Ecosystem and Species Expert Teams were established for each of the four ecosystems evaluated: Mangrove work was led by Laura Geselbracht (The Nature Conservancy); Tidal Emergent Marsh by Mark Woodrey (Grand Bay NERR/Mississippi State University); Oyster Reef by Megan LaPeyre (U. S. Geological Survey/LSU Agricultural Center); and Barrier Islands by P. Soupy Dalyander (U. S. Geological Survey). Additional authors included Blair Tirpak (U. S. Geological Survey/Gulf Coast Prairie LCC), Joshua Reece (Valdosta State University), and Cynthia Kallio Edwards (Gulf Coast Prairie LCC).

The Core Planning Team, Ecosystem and Species Expert Teams, and the individual assessors are collectively referred to as the Assessment Team throughout the document.

SECTION 1: INTRODUCTION

SUMMARY:

This section describes the components of vulnerability assessments, the importance of the habitats of the Gulf Coast region to fish and wildlife species, the economy, and culture. It includes a description and map of the six subregions covered in this Assessment.

MAIN POINTS:

Throughout the GCVA, the term **vulnerability** refers to potential impact (estimated as the combined exposure to and sensitivity of ecosystems and species to potential threats) coupled with adaptive capacity (the ability to sustain or modify despite ecosystem changes).

- The main threats to the Gulf Coast region include hypoxia, urbanization, sea-level rise, wetland loss, altered freshwater inflows, and invasive species.

- The Gulf Coast provides valuable energy resources, abundant seafood, extraordinary beaches, and a rich cultural heritage. Coastal ecosystems are of central importance to communities that rely on them for their livelihood, food, and leisure.[i] As a result, a decline in ecosystem health can have a direct and significant impact on the economy and overall well-being of coastal citizens.

SECTION 2: ECOSYSTEMS & SPECIES ASSESSED

SUMMARY:

This section includes an overview of each of the four main ecosystems assessed; and the species associated with each of them. The four coastal ecosystems were chosen primarily on the availability of data and models. The species chosen are widely distributed across the Gulf, are recognized as conservation targets by at least one LCC, and/or are representative of how other species may be impacted by projected changes.

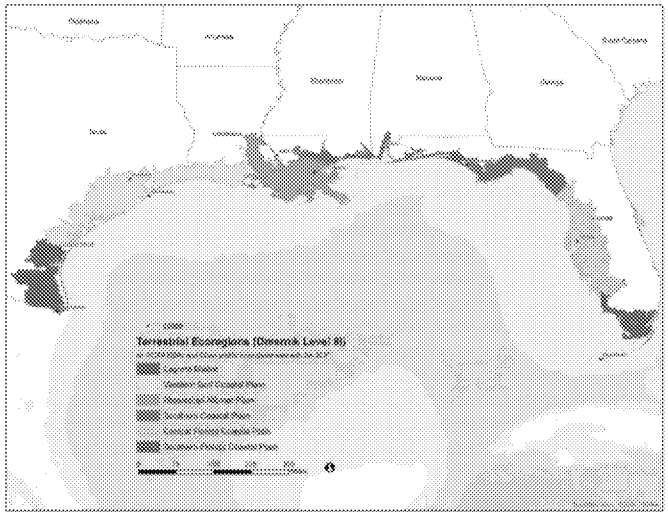


Fig. 1 GCVA subregions modified from the full extent of EPA Level III Terrestrial Ecoregions

MAIN POINTS:

1) MANGROVES are tidally-influenced tropical or subtropical forests found on intertidal mud flats along estuary shores that may extend into river courses.

- The **roseate spoonbill** nests in the Gulf of Mexico along the coasts of Texas, Louisiana, and south Florida and is found throughout the Gulf Coast region outside of breeding season.

2) TIDAL EMERGENT MARSH is dominated by emergent vegetation found along low-wave-energy intertidal areas of estuaries across a range of salinities from fresh to saline.

- **Blue crab** is a valuable commercial species across its range and also has an important role in the structure and function of the estuary.
- **Clapper rail** distribution depends on the presence of tidal salt marsh and fiddler crabs.
- **Mottled duck** is a resident waterfowl species that occurs along the Gulf Coast in two distinct populations – one in the western Gulf and the other in south Florida.
- **Spotted seatrout** depend on estuaries for feeding, spawning, and nursery grounds.

3) OYSTER REEFS are created from the shells of oysters both living and dead, which then provide a hard substrate for oyster larvae to settle, continuing the reef building cycle.

- **Eastern oyster** is a commercially important species scattered throughout the bays and estuaries of the Gulf of Mexico.
- **American oystercatcher** is a shorebird that breeds and winters across the Gulf and has a highly specialized bill for foraging on mollusks.
- **Red drum** is a highly mobile and popular game fish found along the entire Gulf Coast.

4) BARRIER ISLANDS formed during the deceleration of sea level rise over the past 5,000 years and persist from sand delivered from onshore sources and longshore transport. They are the first line of defense for protecting mainland coastal ecosystems from the direct effects of wind, waves, and storms.

- **Black skimmer** is a beach-nesting species that nests in colonies on sparsely vegetated beaches and spoil islands.
- **Kemp's ridley sea turtle** is the world's most endangered sea turtle, with primary nesting regions in Mexico and Texas and scattered nests across the Gulf Coast.
- **Wilson's plover** is a medium-sized shorebird found primarily along dunes and beaches.

SECTION 3: METHODS

SUMMARY:

This section describes the expert engagement process that was used to complete the assessment and brief descriptions of the data sources that were used. Most importantly it explains the Standardized Index of Vulnerability and Value Assessment (SIVVA),[ii] the assessment and prioritization tool that incorporates threats from climate change, land use change, and sea level rise and which was used to conduct the GCVA.

MAIN POINTS:

- The year 2060 was chosen as an assessment timeframe because it coincides with other projects along the Gulf Coast, such as the Southeast Conservation Adaptation Strategy, Florida's Statewide Climate Scenarios, and the State of Louisiana's Coastal Master Plan.
- Assessors were provided with data and maps on climate projections, sea level rise, and projected urban growth for each subregion.
- Assessors were asked to evaluate species and ecosystem vulnerability under 3 different scenarios:
  - low CO_2 emissions (B1 and RCP 2.6) and low (0.41 m) sea level rise
  - low CO_2 emissions (B1 and RCP 2.6) and high (0.82 m) sea level rise
  - high CO_2 emissions (A2 and RCP 8.5) and high (0.82 m) sea level rise
- Assessor engagement was led by Ecosystem and Species Expert Team (ESET) leads, and 144 assessments (each consisting of the 3 scenarios) were completed by 59 individual assessors across the Gulf.

SECTION 4: RESULTS: ECOSYSTEM & SPECIES VULNERABILITY

SUMMARY:

This section describes the threats, adaptive capacity, and overall vulnerability for each ecosystem and species. Figures spatially depict the average vulnerability scores for ecosystems and species as well as vulnerability across climate scenarios and subregions. Given the qualitative nature of the SIVVA, there were minimal differences among the assessments across the three climate scenarios. As a result, vulnerability results display only the most conservative scenario (low CO_2 emissions and low sea level rise).

MAIN POINTS:

- The range in vulnerability scores for species was fairly wide with blue crab at the low end (average vulnerability of 0.30) and Kemp's ridley sea turtle demonstrating high vulnerability (average vulnerability score of 0.71).
- Ecosystem vulnerability across the four systems differed less than it did for species with mangroves being the least vulnerable (average score of 0.62) and tidal emergent marsh being the most vulnerable (average score of 0.70).
- The vulnerability of ecosystems was calculated by averaging the scores from the SIVVA Ecosystem Status and Potential Impact modules. The vulnerability of species was calculated by averaging the scores from the SIVVA Potential Impact (exposure + sensitivity) and Adaptive Capacity modules.

VULNERABILITY: Mangroves & Roseate Spoonbill

MANGROVES

Everglades Mangrove Island/D. Grimes/NPS

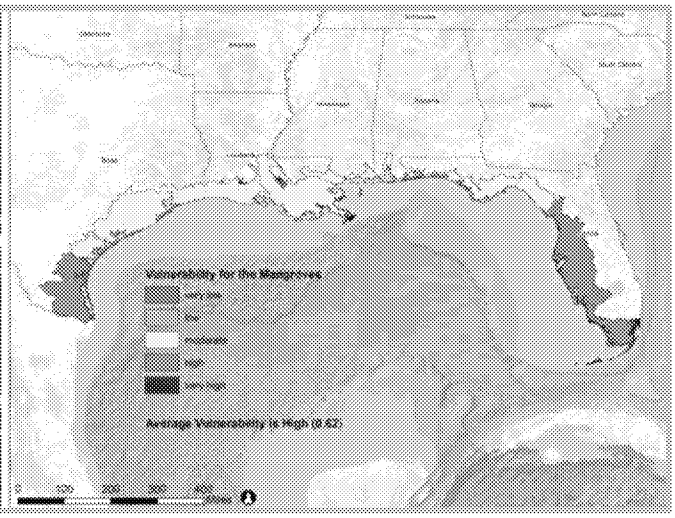


Fig. 2 Vulnerability of Mangroves

Mangroves were highly vulnerable in the Laguna Madre, Central Florida Coastal Plain, and Southern Florida Coastal Plain; and moderately vulnerable elsewhere (Figure 2). Mangrove expansion has been documented in Texas, Louisiana, and Florida; however, future expansion will be dependent on the ability of mangroves to keep pace with sea level rise. The high vulnerability scores reflect mangrove loss based on sea level rise estimates and constraints on range shifts.

ROSEATE SPOONBILL

Roseate Spoonbill/USFWS

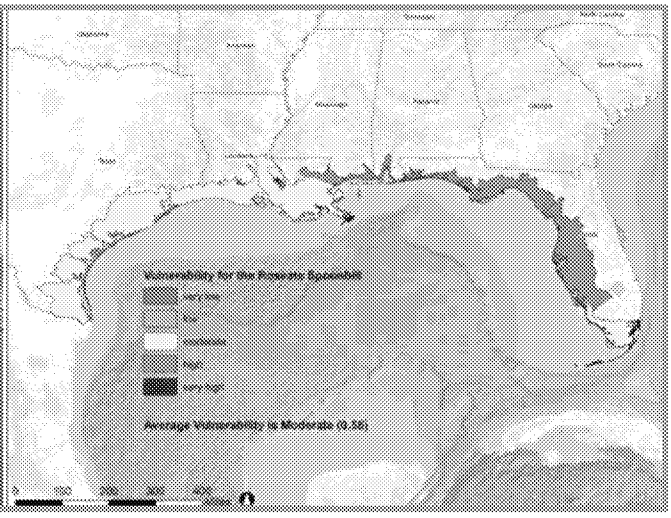
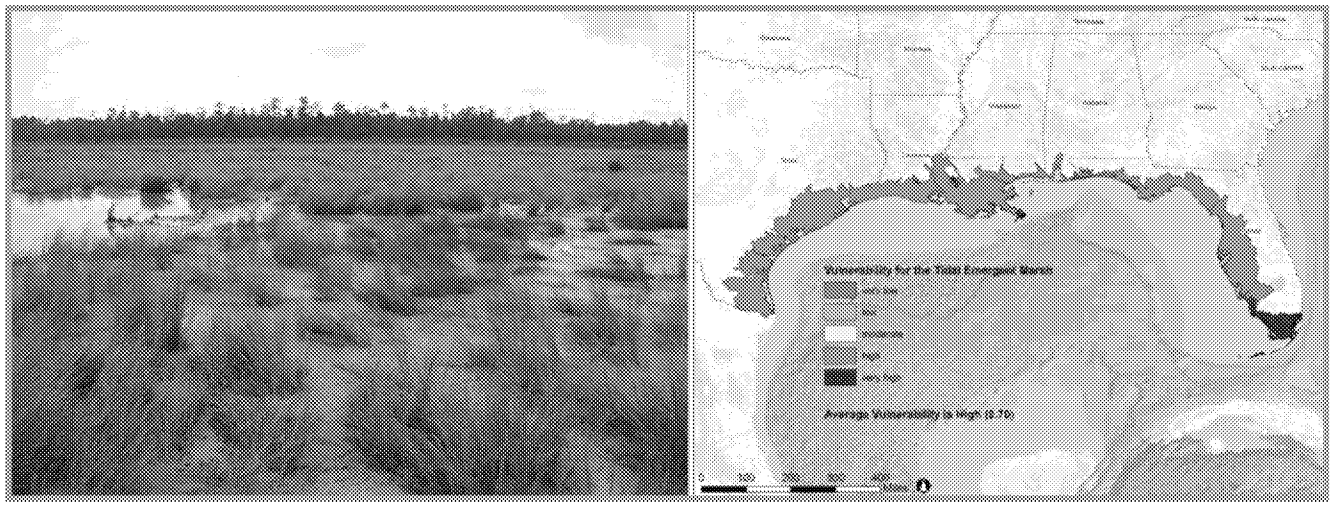


Fig. 3 Vulnerability of Roseate Spoonbill

Roseate spoonbill was most vulnerable in the Southern Coastal Plain and Central Florida Coastal Plain (Figure 3). This is anticipated due to the increased coastal development and the accompanying water management impacts in these subregions. Gulf-wide threats include changes to biotic interactions (specifically prey), loss of habitat to sea level rise and erosion, and storm surge.

VULNERABILITY: Tidal Emergent Marsh, Blue Crab, Clapper Rail, Mottled Duck & Spotted Seat Trout

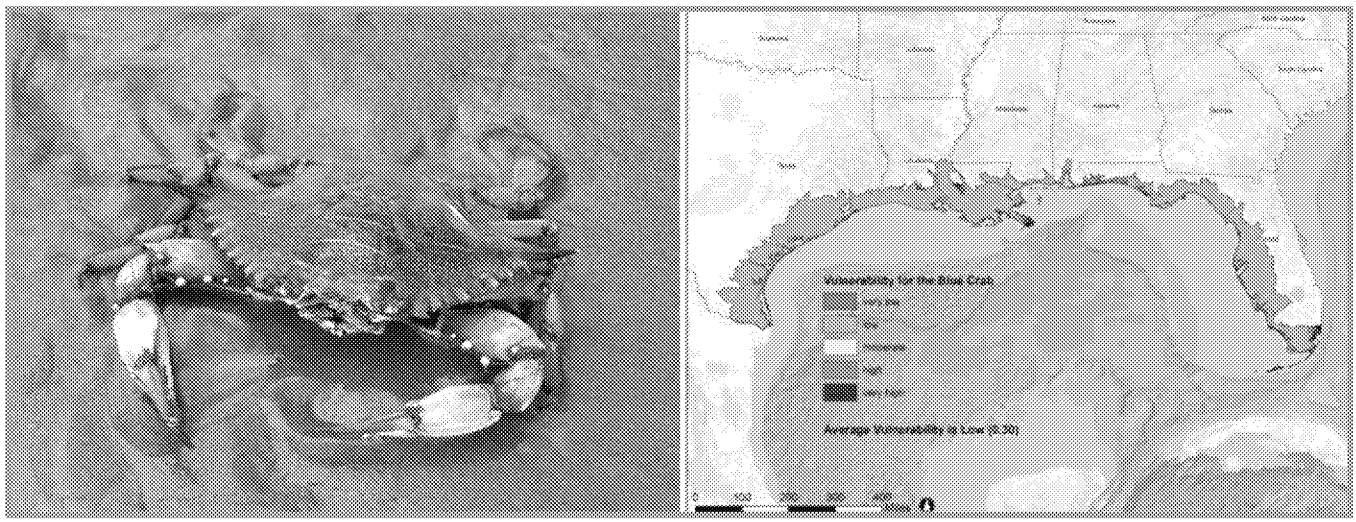
TIDAL EMERGENT MARSH



Goose Point/Platte Marsh/USFWS *Fig. 4 Vulnerability of Tidal Emergent Marsh*

The vulnerability of tidal emergent marsh is high across the entire Gulf coast, except in the Southern Florida coastal plain where it is very high (Figure 4). Sea level rise, fragmentation of the ecosystem, altered hydrology, and constraints on range shift were typically judged to be the most serious threats across all subregions. In the Southern Florida Coastal Plain, these threats were judged to have severe negative impacts on marsh as compared to the other subregions.

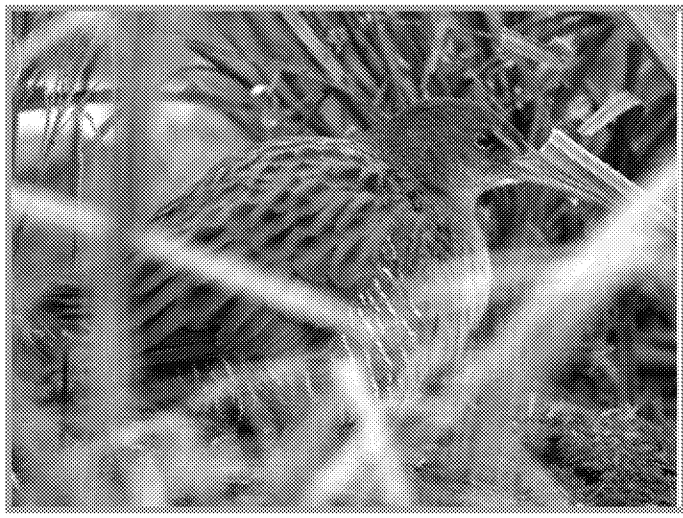
BLUE CRAB



Blue Crab/Jeremy Thorpe/Flickr: EOL Images. CC BY-NC-SA/http://bit.ly/1Mk0Y1K *Fig. 5 Vulnerability of Blue Crab*

Blue crab vulnerability is low across all subregions (Figure 5). Their mobility and ability to tolerate a range of conditions are two characteristics that may be especially helpful in adapting to future conditions. Blue crab may also benefit from an increase in marsh edge.[iii]

CLAPPER RAIL



Clapper Rail/Rinus Baak/USFWS

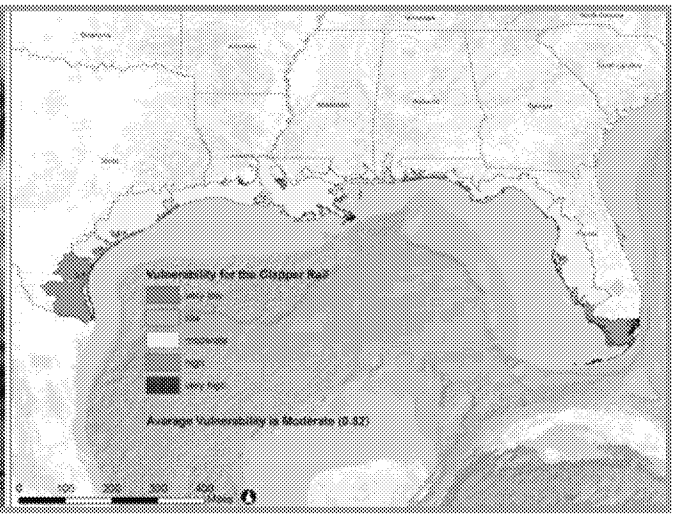


Fig. 6 Vulnerability of Clapper Rail

Clapper rail vulnerability varies from moderate to high (Figure 6). In the Laguna Madre, there are few clapper rails because tidal emergent marsh is limited in this subregion. Thus, these relatively small populations may be more susceptible to projected threats and population fragmentation. Gulf-wide threats to clapper rail include loss of habitat to erosion and increased storm surge and hurricane frequency.

MOTTLED DUCK

Mottled Duck/USFWS

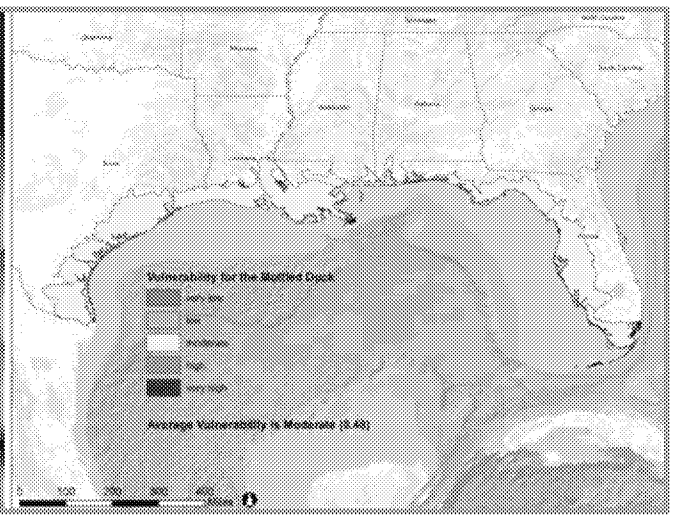
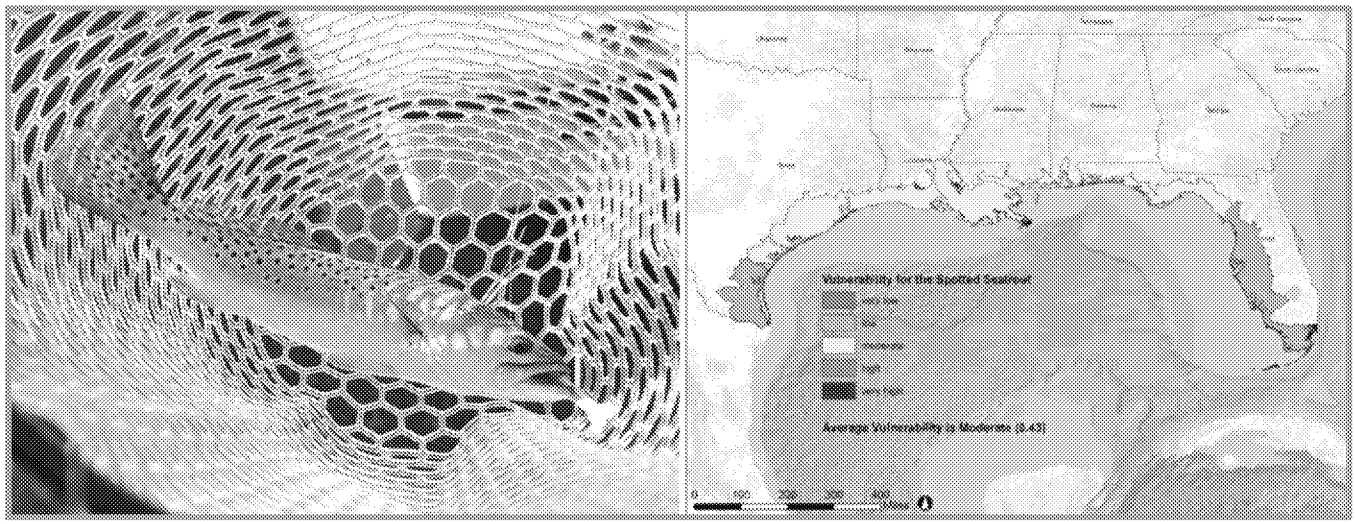


Fig. 7 Vulnerability of Mottled Duck

Mottled duck is moderately vulnerable across the Gulf (Figure 7). In general, assessors thought that although the species may experience some negative impacts associated with climate and land use change, the population will probably not be strongly affected. The mottled duck's demonstrated ability to adapt to a variety of habitats will likely contribute to the species' ability to adjust to change.

SPOTTED SEATROUT

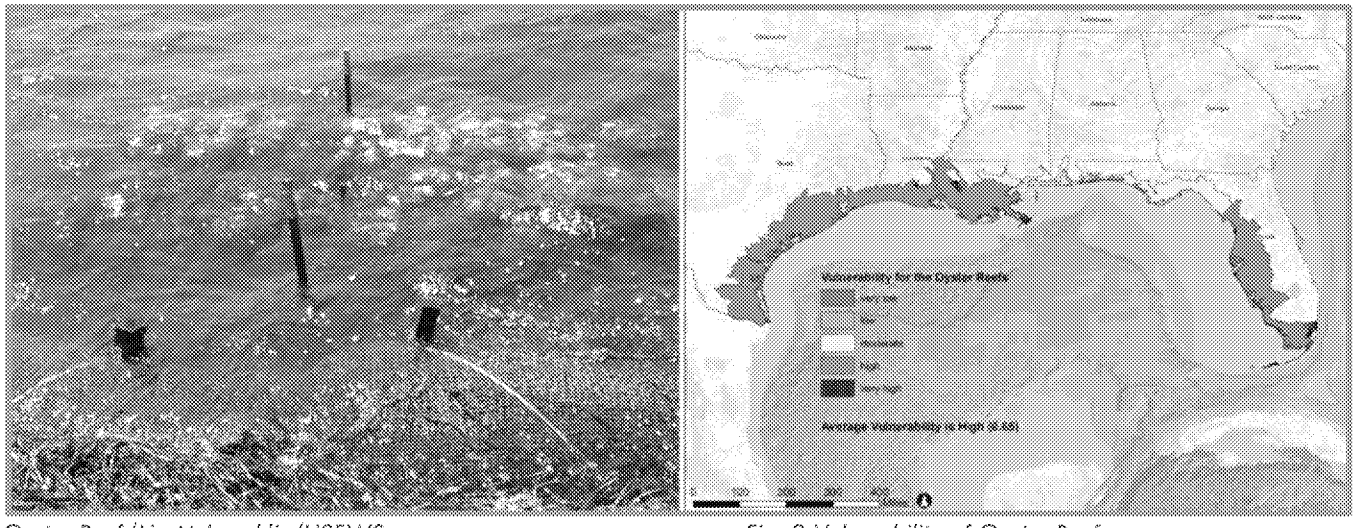


Spotted Seatrout/Tim Donovan/Florida Fish & Wildlife Conservation Commission *Fig. 8 Vulnerability of Spotted Seatrout*

Vulnerability of spotted seatrout to future conditions ranged from low in the Laguna Madre, Central Florida Coastal Plain, and Southern Florida Coastal Plain to moderate in other subregions (Figure 8). In subregions with moderate vulnerability, loss of habitat to sea level rise and erosion were judged to be more severe. Consequently, the limited ability of spotted seatrout to migrate away from threats in those subregions also increased vulnerability.

VULNERABILITY: Oyster Reef, Eastern Oyster, American Oystercatcher & Red Drum

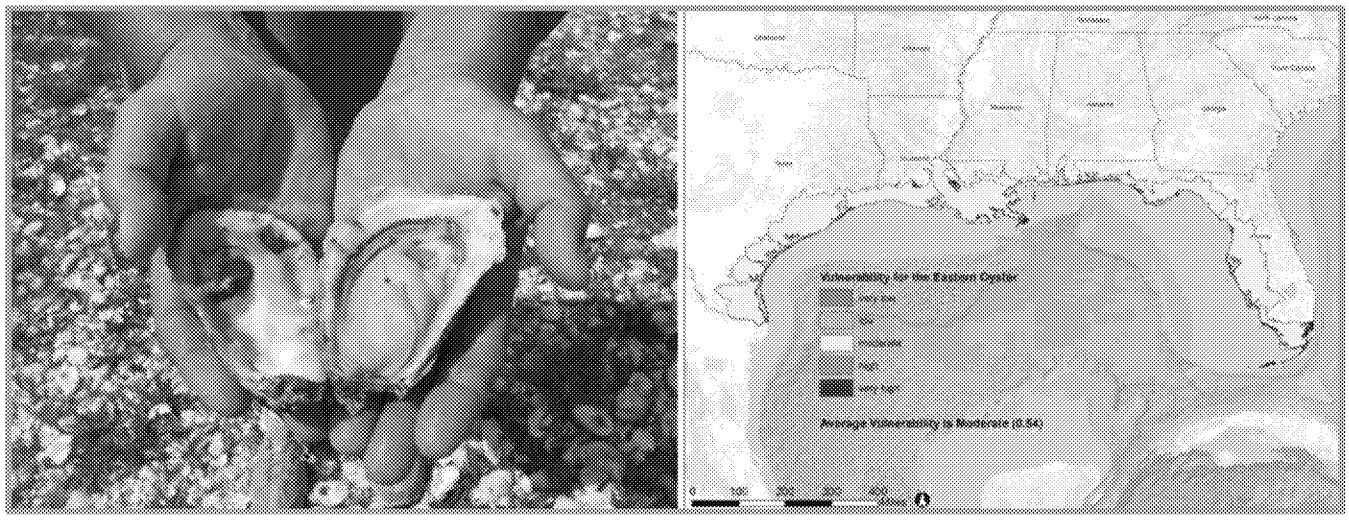
OYSTER REEFS



Oyster Reef/Lia McLaughlin/USFWS *Fig. 9 Vulnerability of Oyster Reefs*

Oyster reefs were judged to be highly vulnerable in all subregions except the Southern Coastal Plain, where they are moderately vulnerable (Figure 9). In the Southern Coastal Plain, assessors noted there was not enough information to score several of the Potential Impacts criteria that affected the average vulnerability score. Altered hydrology was judged to be the biggest threat to oyster reefs. The inability of the physical structures to migrate away from threats also increases their vulnerability.

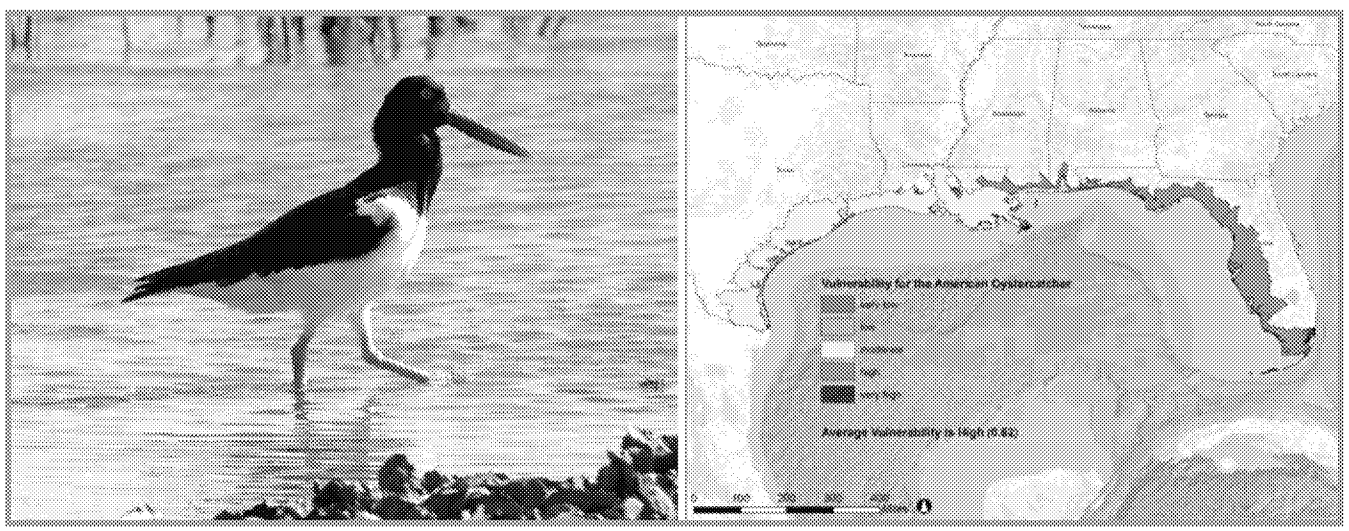
EASTERN OYSTERS



Eastern Oyster Lynda Richardson/USDA-NRCS *Fig. 10 Vulnerability of Eastern Oysters*

Eastern oysters were judged to be moderately vulnerable across all subregions (Figure 10). The species assessment of eastern oysters indicates lower vulnerability than the ecosystem assessment because it takes into consideration the ability of mobile oyster larvae to colonize new areas if conditions are suitable. However, because the eastern oyster is also a commercially valuable species, this vulnerability ranking can be drastically altered if oysters are harvested unsustainably.[iv] Gulf-wide threats to eastern oyster include changes to the natural hydrologic regime and increased predation from oyster drills, which may benefit from high salinities.

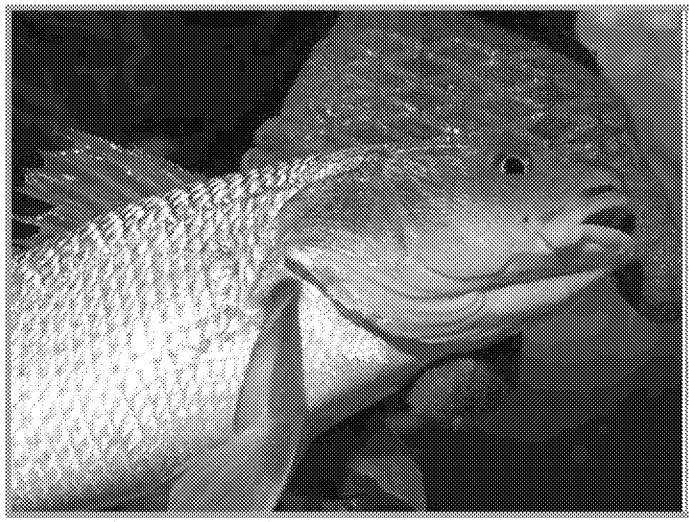
AMERICAN OYSTERCATCHER

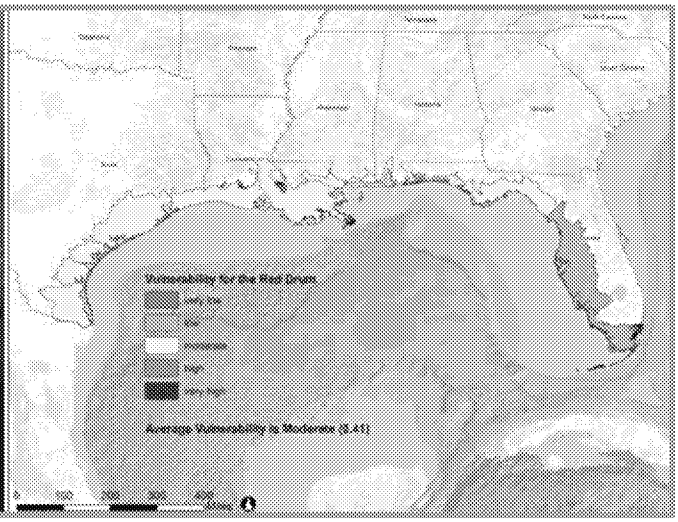


American Oystercatcher/Garry Tucker/USFWS *Fig. 11 Vulnerability of American Oystercatcher*

American oystercatcher was highly vulnerable in the Southern Coastal Plain, Central Florida Coastal Plain, and Southern Florida Coastal Plain and moderately vulnerable in the other subregions (Figure 11). In the highly vulnerable subregions, increased vulnerability was due to barriers to dispersal, such as coastal development and shoreline armoring to prevent beach erosion. Gulf-wide threats include loss of nesting habitat to sea level rise and synergistic effects of climate change, sea level rise, and urbanization.

RED DRUM



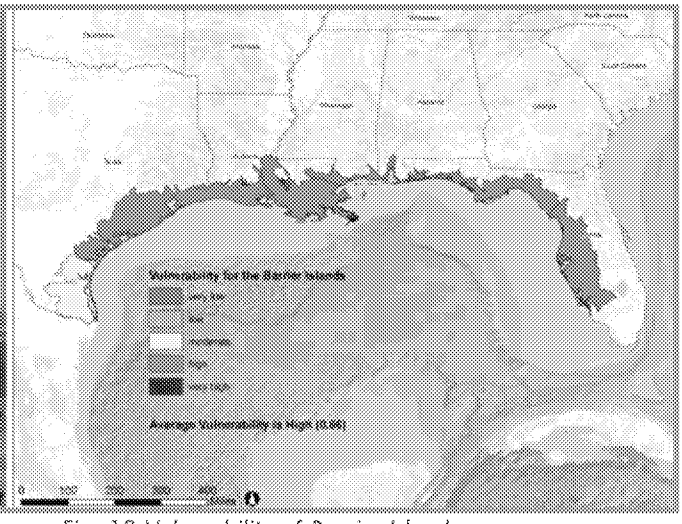


Red Drum/Katie Johnson/Florida Fish & Wildlife Conservation Commission *Fig. 12 Vulnerability of Red Drum*

Red drum vulnerability ranges from low to moderate across the Gulf Coast (Figure 12), driven in part by differences in expected loss of habitat to sea level rise. In the Western Gulf Coastal Plain and Mississippi Alluvial Plain, the loss of marsh habitat may decrease the dispersal of red drum, which increases vulnerability. In the Southern Coastal Plain, the overall vulnerability score was influenced by the relatively poor adaptive capacity scores. Assessors expect that red drum will have the ability to disperse from threats; however, there must be available nursery habitat. Adaptive capacity scores reflected a difference in assessor opinion regarding genetic diversity and the phenotypic plasticity of red drum.

VULNERABILITY: Barrier Islands, Black Skimmer, Kemp's Ridley Sea Turtle & Wilson's Plover

BARRIER ISLANDS

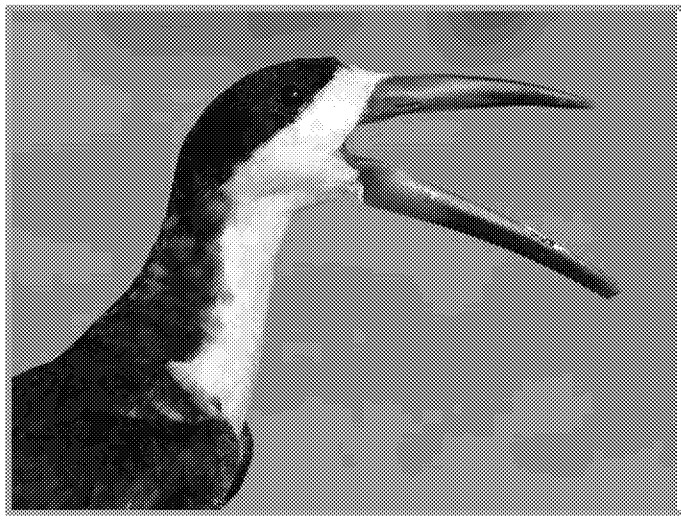


Barrier Island/Greg Thompson/USFWS *Fig. 13 Vulnerability of Barrier Islands*

Barrier island vulnerability is moderate in the Laguna Madre subregion and high in the remaining subregions (Figure 13). Barrier islands were not assessed in the Southern Florida Coastal Plain because the underlying

geology, including the offshore presence of coral reefs, is significantly different than islands throughout the rest of the Gulf. Vulnerability is lower in Laguna Madre because North Padre Island is protected, eliminating development as an issue. Although South Padre Island could potentially be developed, the extent of development will not exceed 30% of the total barrier island. While sea level rise is a threat across all subregions, in Laguna Madre the assessor thought there were no range constraints limiting the ability of the barriers to migrate.

BLACK SKIMMER



Black Skimmer/Florida Fish & Wildlife Conservation Commission

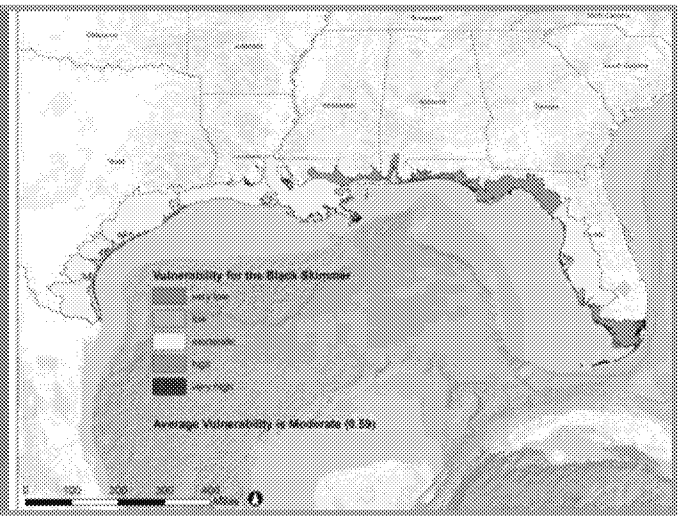
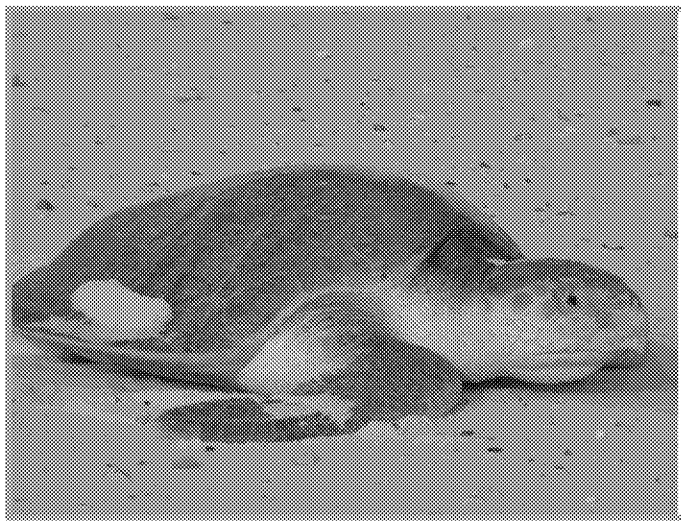


Fig. 14 Vulnerability of Black Skimmer

Black skimmer vulnerability was highest in the Southern Coastal Plain and Southern Florida Coastal Plain due to low adaptive capacity scores in these two subregions (Figure 14). Across all subregions, loss of habitat to sea level rise; impacts from storm surge and runoff; synergistic effects of climate change, sea level rise, and urbanization; and changes to the natural disturbance regime were scored as main threats.

KEMP'S RIDLEY SEA TURTLE



Kemp's Ridley Sea Turtle/Jereme Phillips/USFWS

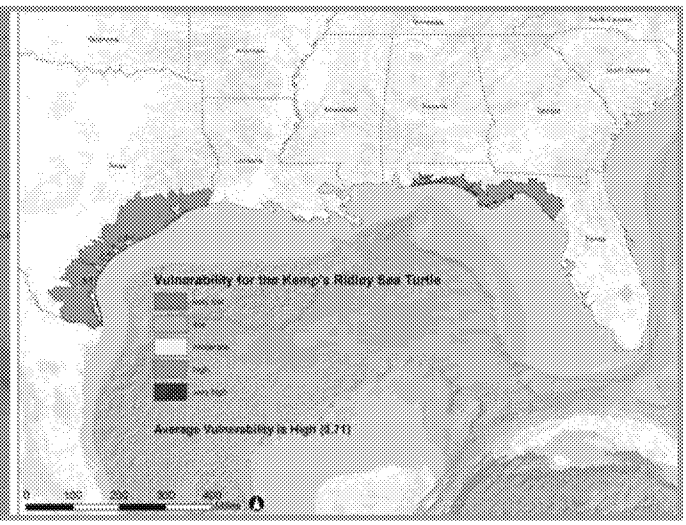
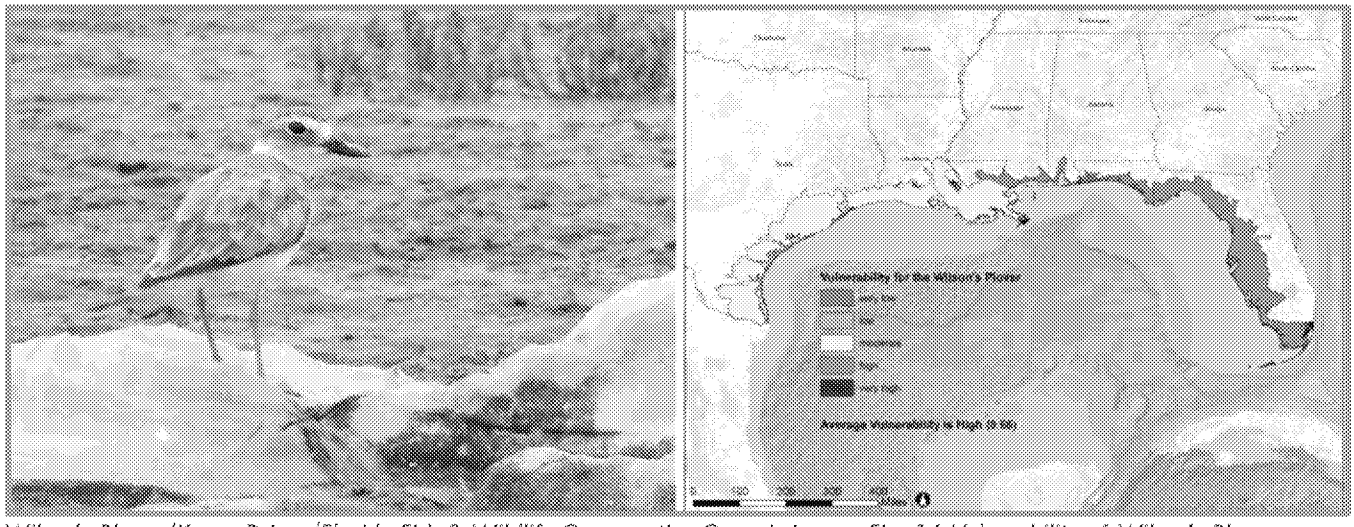


Fig. 15 Vulnerability of Kemp's Ridley Sea Turtle

Kemp's ridley were only assessed in the three subregions in which they most commonly nest, although nesting in

other areas of the U.S. portion of the Gulf Coast does occur. In the three subregions in which Kemp's ridley sea turtles were assessed, they were identified as the most vulnerable species (Figure 15). Kemp's ridley may be sensitive to habitat loss from urban development and sea level rise. Increasing temperatures could also cause shifts in sex ratios.

WILSON'S PLOVER



Wilson's Plover/Karen Driver/Florida Fish & Wildlife Conservation Commission *Fig. 16 Vulnerability of Wilson's Plover*

Wilson's plover vulnerability was high in the Southern Coastal Plain, Central Florida Coastal Plain, and Southern Florida Coastal Plain (Figure 16). In the remaining subregions, vulnerability was moderate. Wilson's plover had the highest potential impacts score in the Southern Coastal Plain, which resulted in high vulnerability; whereas in the Central and Southern Florida Coastal Plains, high vulnerability is due to low adaptive capacity. The loss of habitat to sea level rise; impacts from storm surge and runoff; and the synergistic effects of climate change, sea level rise, urbanization, and changes to the natural disturbance regime were scored as the main threats across all subregions.

SECTION 5: LESSONS LEARNED

SUMMARY:

This section describes some considerations that could be made in future iterations, especially if those efforts cover a large area.

MAIN POINTS:

- Assessors were asked to assess vulnerability based on their interpretation of model outputs and their personal knowledge. While this qualitative approach suited this effort, a more quantitative approach that directly incorporates physical and ecological models would have reduced some of the uncertainty and variation in expert judgment.

- Assessors of the aquatic species commented that SIVVA is more suited for terrestrial species. Additional criteria that addressed issues like fishing pressure, water quality, currents, and ocean acidification would have been beneficial for determining aquatic species vulnerability.

- SIVVA does not have a predefined vulnerability ranking, so the user can dictate the qualitative descriptions (e.g. high vulnerability) and the range of values associated with each of those descriptions. Future assessments could aim to statistically justify rankings or better describe what the various vulnerability levels indicate.

- The ecosystem assessment did not explicitly account for adaptive capacity, which may explain why some moderately vulnerable species were associated with highly vulnerable ecosystems.

- The GCVA assessed how vulnerability varied across the Gulf, but logistical considerations related to the availability of data and reviewers limited the number of subregions. The spatial scale of these subregions did detect differences in vulnerability; however, future assessments could identify input data more appropriate for assessing vulnerability at finer spatial scales.

- Higher spatial resolution data would have improved the usefulness of the map layers that were provided to assessors.

- The decision to use a single set of species was made in the interest of consistency; however, some of the species chosen did not use all of the regions in the same way, or at all. For example, black skimmer in Texas use man-made islands in sheltered regions rather than barrier islands, and Kemp's ridley do not nest throughout the entire Gulf region. An alternate strategy could use widespread species where possible but substitute local species to capture regional differences in habitat usage.

SECTION 6: UNCERTAINTIES AND POTENTIAL FUTURE RESEARCH

SUMMARY:

The application of SIVVA allows the user to flag criteria where high uncertainty exists in conducting the assessment. This enables the identification of research priorities. This section notes some of the identified data gaps for the Gulf Coast region.

MAIN POINTS:

- A lack of information regarding impacts from projected changes in disturbance regimes, biotic interactions, and synergistic effects were commonly cited in both the species and ecosystem assessments.

- Many of the species assessments identified a lack of information on genetic diversity, phenotypic plasticity, life history, and species responses to past climate change and sea level rise.

- Most assessors indicated they were unaware of data regarding species responses to past sea level rise and climate change.

SECTION 7: SETTING THE STAGE FOR ADAPTATION

SUMMARY:

This section includes how the results of the GCVA can be used to inform adaptation strategies such as the Southeast Conservation Adaptation Strategy (SECAS) as well as coordinate conservation actions across the Gulf to maximize limited funding and the ecological impacts of those activities. SECAS was initiated by the

Directors of the Southeastern Association of Fish & Wildlife Agencies and members of the Southeast Natural Resource Leaders Group to provide a broader spatial and temporal context for conservation across the Southeast.

MAIN POINTS:

- The GCVA can be used to inform actions and link individual actions to support regional conservation and adaptation efforts by:
  - Identifying vulnerable species and ecosystems across the Gulf region;
  - Identifying the most common threats to species and ecosystems;
  - Identifying research gaps;
  - Re-evaluating vulnerability as new data become available.

- Assessors identified a number of management strategies that could be used as part of the following four general adaptation strategies identified by Stein et al. (2014)[v] as follows:
  - ***Reduce non-climate stresses***: Educating the public about the consequences of disturbing nesting and foraging birds, preventing overfishing/overharvesting of popular species, and reducing bycatch mortality can alleviate pressure on some species.
  - ***Protect key ecosystem features***: Areas that are currently on the threshold of suitability should be considered for restoration. For example, oyster reefs with marginal water quality could be targeted for habitat restoration to promote future population growth or recruitment in extreme years when isohalines have moved up or down estuary.
  - ***Restore structure and function***: Reducing the restrictions on freshwater flow can ensure that the needs of the downstream ecosystems and species are met.
  - ***Protect refugia***: Establishing marine reserves that provide refuge for populations of exploited species may be needed, including the establishment of protected reef areas that can provide source larvae.

The GCVA sets the stage for further development of adaptation strategies and tools to ensure conservation of the biological, cultural, economic, and recreational resources of the Gulf Coast. Although specific management actions should be based on local conditions, the GCVA can inform the decision-making process to ensure that conservation and restoration of areas and species focuses on those that are most vulnerable, most responsive to action, and most limiting. Advancing coordinated, Gulf-wide conservation efforts that supersede political and administrative boundaries is needed to ensure the long-term sustainability of the Gulf region, which will have far-reaching impacts for both wildlife and humans.

ACKNOWLEDGEMENTS

The GCVA was initiated by the four Landscape Conservation Cooperatives (LCCs) that cover the Gulf of Mexico: the Gulf Coast Prairie, Gulf Coastal Plains & Ozarks, South Atlantic, and Peninsular Florida LCCs. Each LCC is directed by a Steering Committee of partners that also provided support for this project. Additional support and guidance was provided through the National Oceanic and Atmospheric Administration (NOAA), the United States Fish & Wildlife Service (USFWS), the Northern Gulf Institute (NGI), the Gulf of Mexico Alliance (GOMA), the Louisiana Coastal Protection and Restoration Authority, and the United States Geological Survey (USGS). Individuals from these organizations formed the Core Planning Team. The Core Planning Team particularly recognizes Laurie Rounds who led the initial effort on this project, and without whose vision we would not have initiated this work.

SUGGESTED CITATION

Watson, A., J. Reece, B.E. Tirpak, C. K. Edwards, L. Geselbracht, M. Woodrey, M. LaPeyre, and P. S. Dalyander. 2015. The Gulf Coast Vulnerability Assessment: *Mangrove, Tidal Emergent Marsh, Barrier Islands, and Oyster Reef*. 132 p. *Available from: http://gulfcoastprairielcc.org/science/science-projects/gulf-coast-vulnerability-assessment/*

Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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[v] Stein, B.A., P. Glick, N. Edelson, A. Staudt (eds.). 2014. Climate-Smart Conservation: Putting Adaptation Principles into Practice. National Wildlife Federation, Washington, D.C.

Building Partnerships for a Healthier Gulf

GULF OF MEXICO ALLIANCE

Resilience • Habitats • Water • Wildlife • Monitoring • Education

GOVERNORS' ACTION PLAN III

For Healthy and Resilient Coasts

2016 - 2021

"We, the Gulf States, share the responsibility for a healthy environment and strong economy in the Gulf of Mexico and the Alliance represents what can be achieved when we work together to address common priorities."

– Phillip Hinesley, Coastal Section Chief
Alabama Department of Conservation and Natural Resources
State Lands Division

Cover Photo #4: *San Carlos. Julie Dennis, Florida Department of Economic Opportunity*

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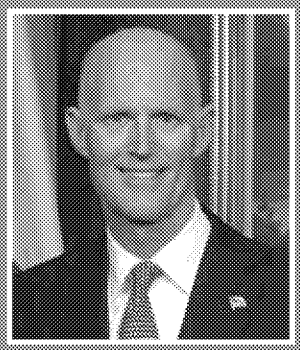
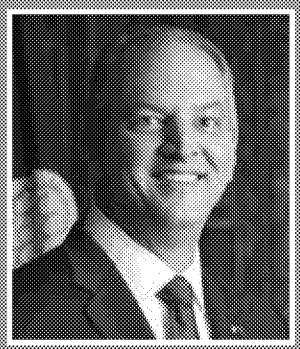
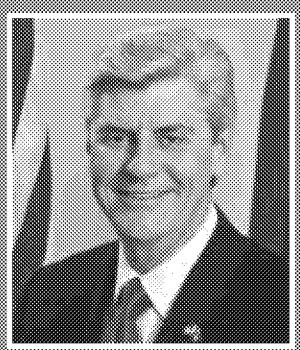
Governor Robert Bentley, Alabama



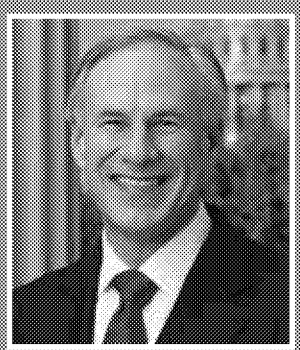
Governor Rick Scott, Florida



Governor John Bel Edwards, Louisiana



Governor Phil Bryant, Mississippi



Governor Greg Abbott, Texas

Dear Gulf Residents and Visitors,

We, the Governors of the five U.S. Gulf States, recognize that the quality of life for citizens and visitors is culturally bound to the benefits provided by our natural resources. As the most productive body of water in the United States, the Gulf of Mexico has natural resources like no other, including rich and bountiful estuaries that provide 78% of our nation's shrimp landings; white sandy beaches that provide nearly $10 trillion in annual wages; working waterfronts encompassing 13 of the nation's 20 leading ports by tonnage; and a rich outer continental shelf and deep canyon area that provide 50% of the Nation's oil reserves.

In order to maintain these valuable energy resources, abundant seafood, and extraordinary recreational activities of the Gulf of Mexico, the adjacent states assume great responsibility. Therefore, eleven years ago, the U.S. Gulf States formed the Gulf of Mexico Alliance, a regional collaborative effort with a goal of improving the health and sustainability of our coastal areas and the lives of millions of people that live within and visit this region every year.

On the heels of devastating natural disasters, the Alliance issued our first Action Plan in 2006, challenging our partners in the region to come together to form a collaboration capable of identifying regional Gulf issues that are a priority for the ecological and economic health of each state. In 2009, we issued a second Action Plan to address those priorities that advanced the goal while maintaining a strong alliance between the Gulf States and our regional partners. The 2010 Deepwater Horizon oil spill tested the strength of the Alliance, creating unprecedented challenges and opportunities to work together toward Gulf restoration. Going forward, this third *Governors' Action Plan* addresses coastal resilience; habitat resources; water resources; wildlife and fisheries; data and monitoring; and education and engagement. This plan reinforces the Alliance's commitment to effective regional collaboration and coordination, addressing issues common to all five Gulf States in a voluntary way.

We understand that by working together we can improve our resource management and leave a lasting legacy for Gulf coastal residents and visitors alike. Therefore, as the executives of the five Gulf States, we pledge our full support of and solicit your help toward implementing the actions detailed in this *Governors' Action Plan III for Healthy and Resilient Coasts.*

Robert Bentley
Governor of Alabama

Rick Scott
Governor of Florida

John Bel Edwards
Governor of Louisiana

Phil Bryant
Governor of Mississippi

Greg Abbott
Governor of Texas

Building Partnerships for a Healthier Gulf

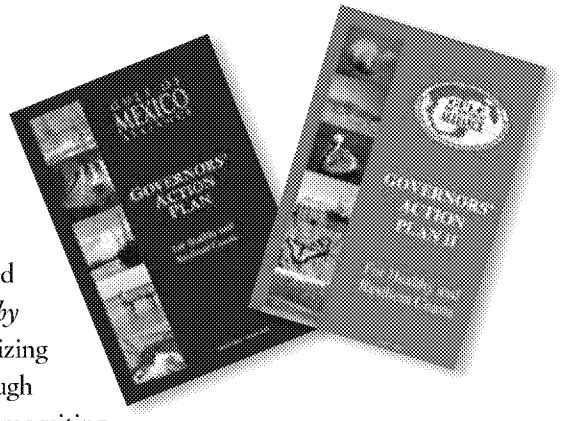
The Gulf of Mexico Alliance is a partnership of the five U.S. Gulf States, federal agencies, academic organizations, businesses, and other non-governmental organizations. *Our mission is to enhance the environmental and economic health of the Gulf of Mexico through increased regional collaboration.* This *Governors' Action Plan III* for Healthy and Resilient Coasts is the third in a series of collaborative work plans for the Gulf of Mexico Alliance focusing on priority issues determined by the Gulf States themselves:

Enhancing Coastal Community Resilience
Improving Data Access and Baseline Monitoring
Increasing Stewardship through Education and Engagement
Conserving and Restoring Habitat Resources
Improving the Health of Wildlife and Fisheries
Improving the Quality of Water Resources

The overarching goal of the Gulf of Mexico Alliance is to address the region's priorities by:

- providing forums for collaboration on priority issues,
- developing and modifying tools to address regional issues,
- tracking restoration efforts,
- identifying and expanding opportunities for comprehensive monitoring,
- expanding the Alliance network to enable strategic partnerships, and
- continuing to administer a large oil-spill research program.

History



The Gulf of Mexico Alliance was established in 2004 in response to the U.S. Ocean Action Plan. On the heels of Hurricanes Katrina and Rita in 2005, the five U.S. Gulf State Governors signed the first *Governors' Action Plan for Healthy and Resilient Coasts* in March 2006. Realizing the mission could only be achieved through diverse partnerships, the Alliance began recruiting federal, non-governmental, and academic partners to be members. The Gulf of Mexico Alliance came together and achieved ninety-nine percent of the original *Action Plan* objectives in just three short years. Building on the tremendous success of the first plan, the Gulf of Mexico Alliance released its second plan, *Governors' Action Plan II* in 2009. This five-year plan was more aggressive with solutions to address the challenges of the time. Approximately one year later, however, the Deepwater Horizon oil spill occurred, and restoration became one of the Gulf's largest challenges to date.

During the course of Action Plan II, the Gulf of Mexico Alliance formalized as a non-profit organization, managed six priority issue teams, and began to administer a large oil spill research program. The Alliance's accomplishments resulting from *Action Plan I* and *Action Plan II* are detailed in the *Gulf of Mexico Alliance's Ten Year Summary Report: 2004-2014.*

The Power of Partnerships

Heidi Stiller, National Oceanic and Atmospheric Administration

The Gulf of Mexico Alliance is a network of partners that collaborate to address our identified priority issues in ways that a single entity cannot. Our partners provide the talent and resources needed to realize on-the-ground efforts.

State Partners

Leadership from the five Gulf States forms the foundation of the Gulf of Mexico Alliance and each of the Gulf States has committed time and resources to its successful implementation. State scientists, technical experts, and resource managers work collaboratively to address regional matters of shared concern. Each state leads a team focused on making progress on a particular issue;

- Alabama leads the Education and Engagement Team;
- Florida leads the Data and Monitoring Team;
- Louisiana leads the Habitat Resources Team;
- Mississippi leads both the Coastal Resilience and Water Resources Teams; and
- Texas leads the Wildlife and Fisheries Team.

Federal Partners

The success of the Gulf of Mexico Alliance is based not only on the dedication of the five Gulf States, but also on commitment from our federal partners. Thirteen federal agencies support the Alliance through a federal work group under the leadership. The goals of the federal work group are to support the Gulf States and to coordinate an integrated federal response to priority regional issues identified by the Alliance. The federal work group brings diverse expertise and established experience. By integrating these capabilities, the impact of federal resources is fully maximized.

BOEM NASA USDA USGS

Academic Partners

The academic community is a critical partner for addressing Alliance priorities in the Gulf region. In addition to expertise, innovation, and science capacities, universities educate the next generation of scientists and engineers required to support a healthy, sustained Gulf environment and economy. The Gulf of Mexico Alliance works closely with academic partners who actively support and participate in Priority Issue Teams, co-sponsor Alliance meetings, and share our news.

Non-governmental Partners

Non-governmental organizations are another important sector to the Gulf of Mexico Alliance. Many non-governmental organizations participate in the Priority Issue Teams and work together on Alliance-sponsored projects. Non-governmental organization partners include organizations that focus on:

- natural resource conservation, restoration and protection;
- social and environmental justice;
- environmental advocacy;
- coastal resilience;
- education and outreach; and
- workforce development.

These partners bring to the Alliance a stronger link to local communities and a variety of skills such as research and monitoring capabilities, project implementation, communication expertise, and funding opportunity development.

Business Partners

Business and industry involvement are important to successfully achieving the Alliance's goal of healthy ecosystems and economies. The Gulf of Mexico Alliance Business Advisory Council facilitates communication between Alliance Management and the diverse group of industries that are dependent upon the common resources of the Gulf of Mexico. The Alliance established the Business Advisory Council to partner with business members on priority issues and regional initiatives as well as to deepen a sense of stewardship in the Gulf of Mexico. The Business Advisory Council consists of representatives of the following industries:

- agriculture
- commercial and recreational fishing
- manufacturing
- oil and gas
- seafood processing
- tourism
- transportation (including shipping and harbors)
- utilities/energy (including power generation and alternative sources)

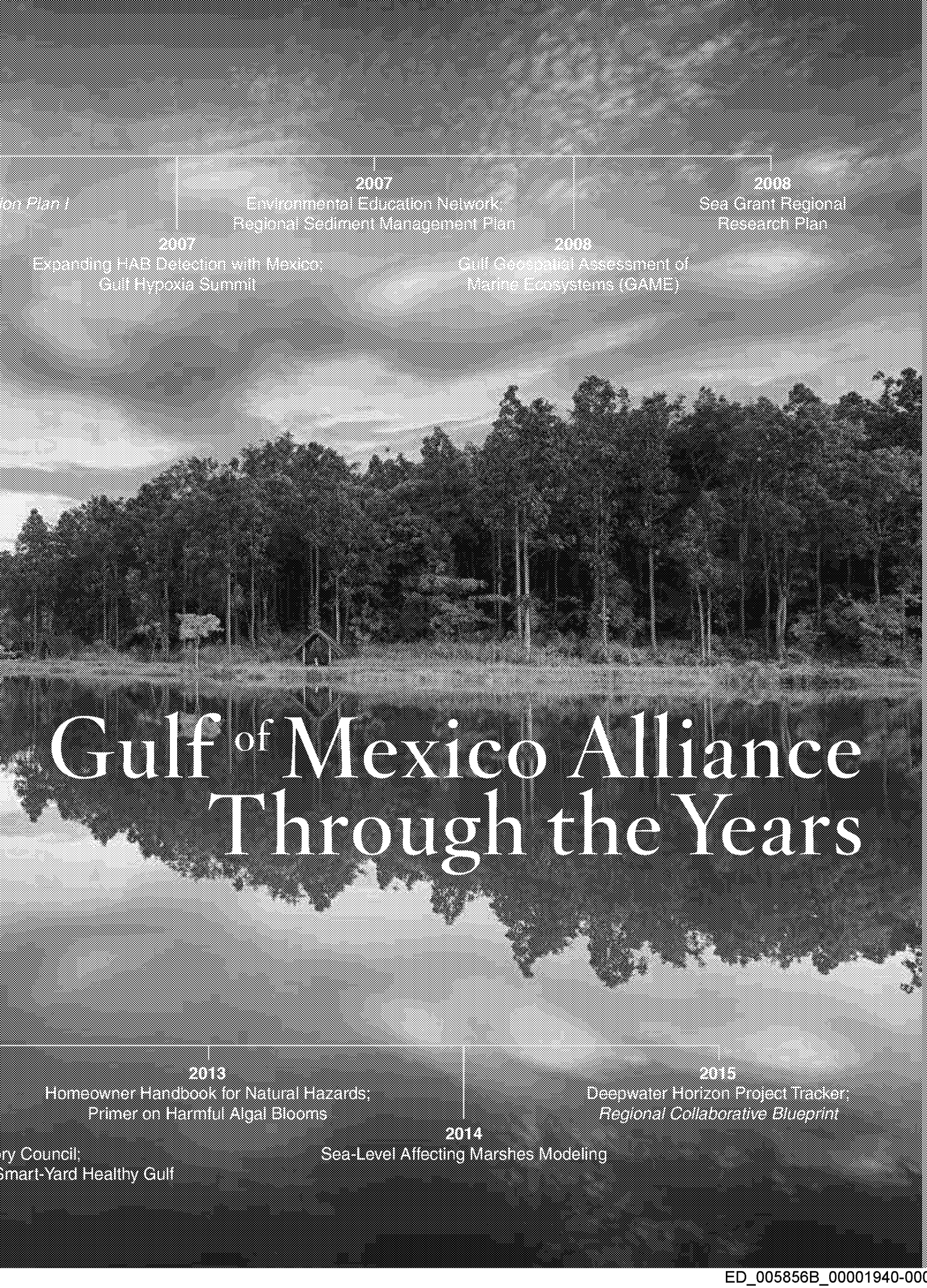
Role of Mexico and Cuba

The Gulf of Mexico Alliance recognizes that the five U.S. Gulf States are not the only residents of this important ecosystem. Our neighboring countries also utilize and protect the resources of the Gulf of Mexico. To be truly successful in improving the ecological health of this region, we must collaborate when possible to address our shared concerns. The Alliance has a working history with partners in Mexico and intends to maintain that valuable relationship. As the political relationship evolves between the United States and Cuba, we will explore partnerships as appropriate.

With *Action Plan III*, comes expanded opportunities for growth and collaboration. Gulf Star is a new Alliance public-private initiative designed to increase the region's ecosystem health and resilience by supporting implementation of *Action Plan III*.

Gulf Star is actively working to secure $5 million over the next five years. Founding private members of this initiative are Shell, the Gulf of Mexico Foundation, and The Nature Conservancy. These three members are setting a course for supporting regional collaboration to address challenging Gulf issues. Gulf Star is also supported by the five U.S. Gulf States and federal agencies.


2000
Oceans Act of 2000
2004
Gulf Governors' Agreement
and Call to Action
2006
Governors' Act
2003
Pew Oceans Commission Report
calling for regional collaboration
2005
Priority Issue Workshops
Hurricanes Katrina & Rita
2009
Governors' Action Plan II
2011
Primer on Hypoxia in the Gulf of Mexico:
Comparing Mexican & US Conservation Frameworks
2010
Deepwater Horizon Incident:
Gulf of Mexico Research Initiative
2012
GOMA Business Adviso
Ecosystem Services Assessments; S



Gulf of Mexico Alliance Through the Years

2007
Environmental Education Network;
Regional Sediment Management Plan

2008
Sea Grant Regional
Research Plan

2007
Expanding HAB Detection with Mexico;
Gulf Hypoxia Summit

2008
Gulf Geospatial Assessment of
Marine Ecosystems (GAME)

2013
Homeowner Handbook for Natural Hazards;
Primer on Harmful Algal Blooms

2014
Sea-Level Affecting Marshes Modeling

2015
Deepwater Horizon Project Tracker;
Regional Collaborative Blueprint

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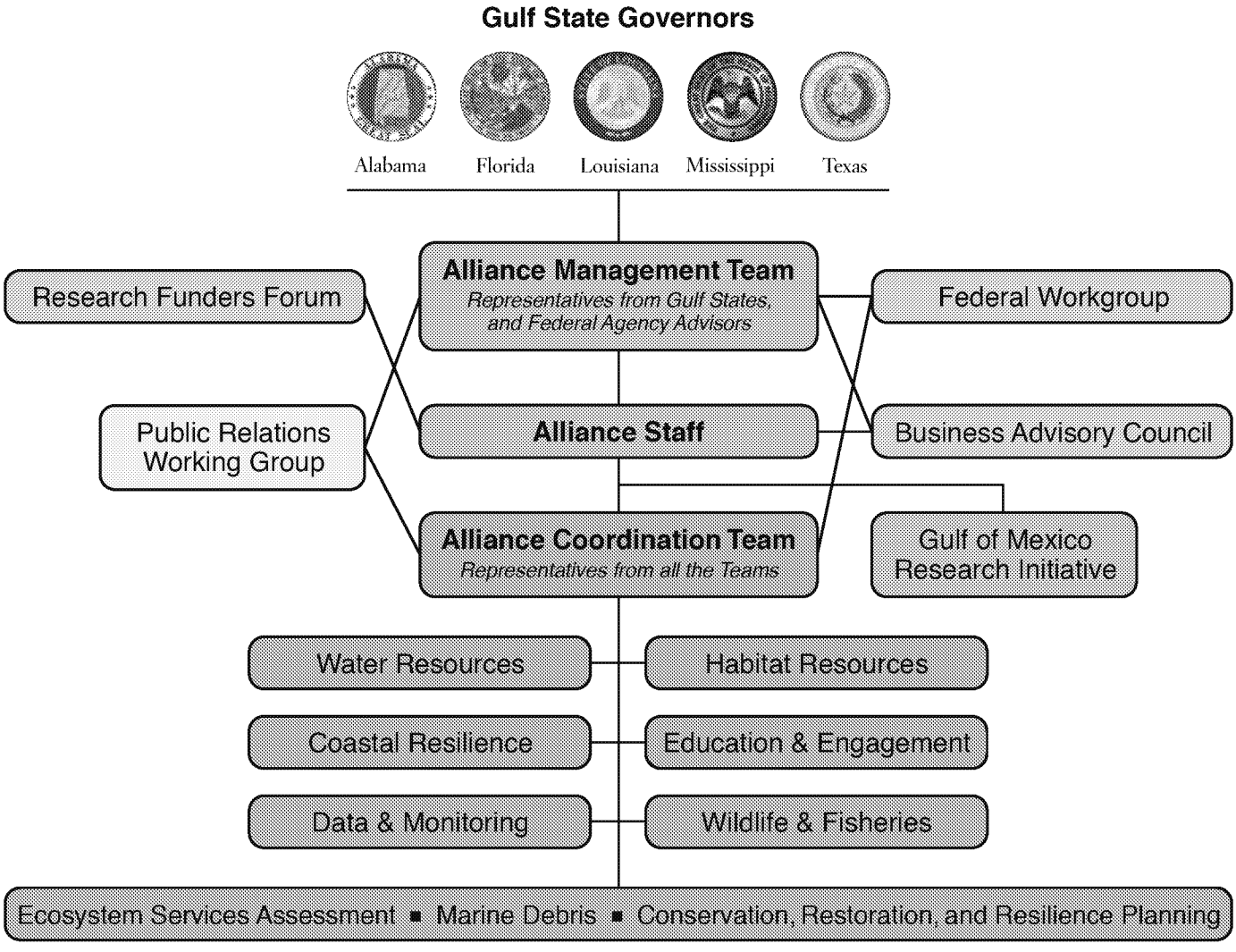
Organization of the Gulf of Mexico Alliance

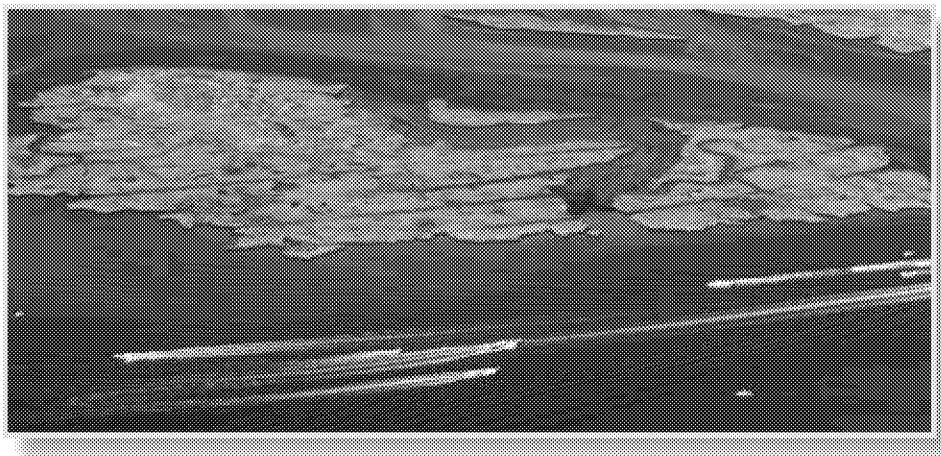
Gulf of Mexico Alliance partners believe collaboration brings exponential results. Our broad network includes state and federal agencies, academic organizations, businesses, and other non-governmental organization in the region who work together to address the region's priorities.

Early on in the formation of the Gulf of Mexico Alliance, the Alliance's governing body adopted a constitution to document how our partnership network functions. While our organization has grown through the years, the basic structure has remained the same. Today, the Gulf of Mexico Alliance's organization also includes a small staff and several supporting committees as shown below.



"We greatly value the partnerships developed through the Gulf of Mexico Alliance. It is a truly unique organization in the region dedicated to the power of collaborative work to reach common goals. These collaborative efforts will continue to become even more important with time. We are glad to be a part of the Alliance since its beginning and as it embarks on this current Action Plan."

— Kristen Laursen, Gulf of Mexico Regional Coordinator
National Oceanic and Atmospheric Administration



Alliance Management Team is made up of the representatives of the five Gulf State governors with Federal Agencies and other organizations serving in advisory capacity.

Alliance Staff administers two primary programs, the Priority Issues Programs and the Gulf of Mexico Research Initiative.

Alliance Coordination Team is made up of representatives from each of the Priority Issue Teams, including state chairs, coordinators, and federal liaisons that meet on a regular basis to coordinate across the teams, as well as to plan organization-wide meetings.

Priority Issue Teams are a hallmark of the Gulf of Mexico Alliance. These state-led teams, focused on well-defined issues, are the key to our success. They are composed of region-wide partners who collaborate on a regular basis to achieve individual team objectives. Specific actions associated with addressing the priority issues are developed and implemented by the voluntary members of the teams, with approval from the Alliance Management Team. In addition to specific projects, the teams build relationships among stakeholders with common interest or expertise.

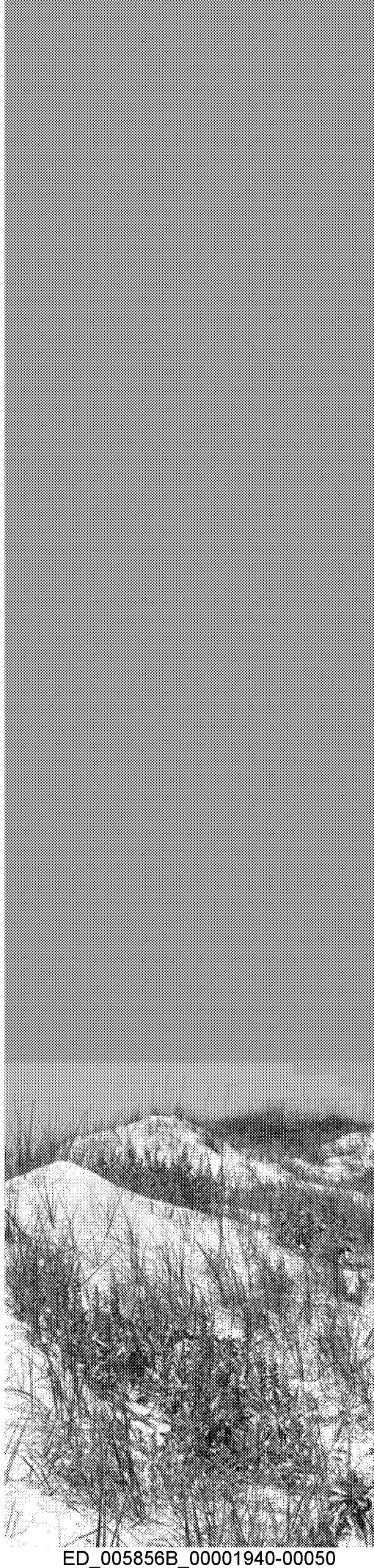
Federal Working Group is made up of thirteen federal agencies that bring diverse expertise and established experience to the Alliance.

Public Relations Committee promotes the identity of the Alliance, its mission, and the Priority Issue Teams to our stakeholders.

Business Advisory Council provides advice and input to the Gulf of Mexico Alliance from industries operating in and around the Gulf of Mexico region.

Regional Research Funders Forum is an open platform for all funding programs that support science and research in the Gulf of Mexico to increase collaboration and coordination.

Gulf of Mexico Research Initiative is a ten-year oil spill research funding program with a goal to improve society's ability to understand, respond to, and mitigate the impacts of petroleum pollution and related stressors of the marine and coastal ecosystems. The Alliance administers the Gulf of Mexico Research Initiative outside the scope of the *Governors' Action Plan.*



Our Priorities

St. George, SKME Blitch

The strength of the Gulf of Mexico Alliance is bringing together the stakeholders in the Gulf States in a shared vision for a healthy and resilient Gulf of Mexico. The Alliance focuses on a suite of issues determined by the Gulf States as those common to all five. This targeted approach has provided a strong foundation for long-term regional collaboration. The Gulf of Mexico Alliance addresses six priority issues:

- **Coastal Resilience**
- **Data & Monitoring**
- **Education & Engagement**
- **Habitat Resources**
- **Water Resources; and**
- **Wildlife & Fisheries**

The Alliance's six priority issues offer the framework for defining all its goals and actions. The issues in the *Governors' Action Plan III* are slightly different than those in *Action Plans I and II* to reflect alignment with other efforts in the Gulf region. After 10 years of successful joint effort, the Alliance Management Team reevaluated our priorities. This resulted in reorganized to address ongoing coastal issues, and new teams are pursuing emerging issues related to regional data and monitoring as well as wildlife and fisheries. What remains the same is the Gulf States' commitment of time and resources to the Alliance's priority issues.

Priority Issue Teams

Each state leads a cross-state and multi-discipline team focused on making progress in a specific area. These teams are the vital component of the Gulf of Mexico Alliance organization. Teams focus on the issues through a collaborative approach with scientific, technical, and resource management experts who have deep understanding of Gulf issues and broad practical experience, including the ability to maximize the impact of funding. The teams are comprised of Alliance members from state and federal agencies, non-governmental organizations, academia and businesses. The teams work together to develop specific actions to address priority issues, with the Alliance Management Team providing high-level review and final approval.

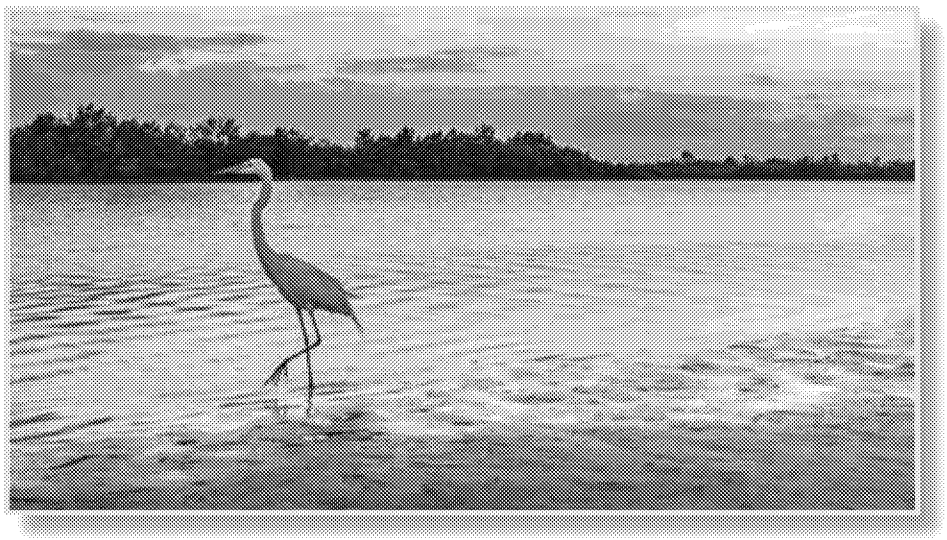
As it has been since the beginning, involvement in the Gulf of Mexico Alliance's Priority Issue Teams is open and voluntary, and participation by wide-ranging Gulf stakeholders is highly encouraged. The Alliance serves as a forum for exchanging information about the Gulf and the issues that impact its ecological health. Robust participation on the teams improves the quality of our actions and leads to the most beneficial outcomes for a healthy and resilient Gulf of Mexico.

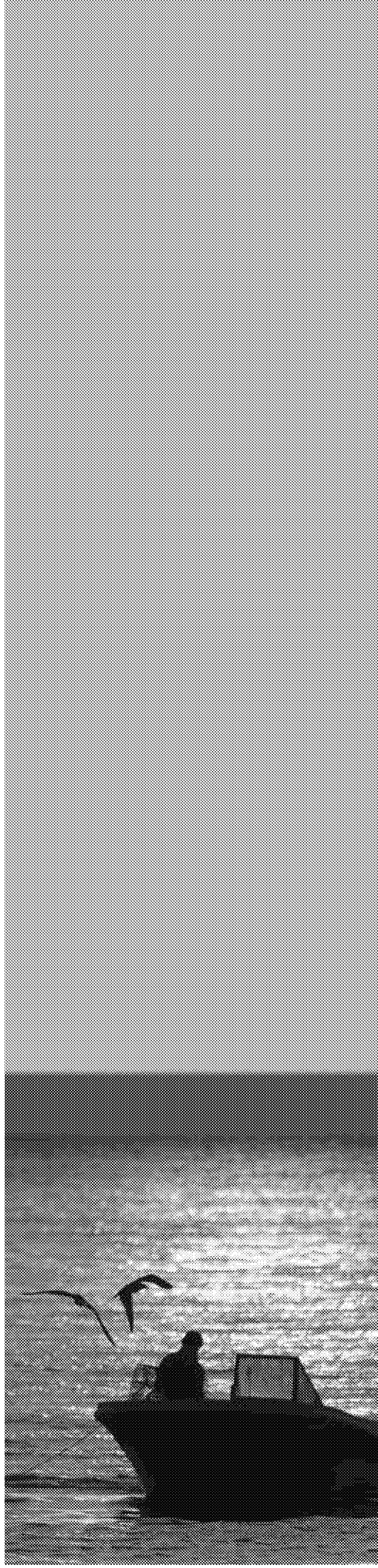
Cross-Team Initiatives

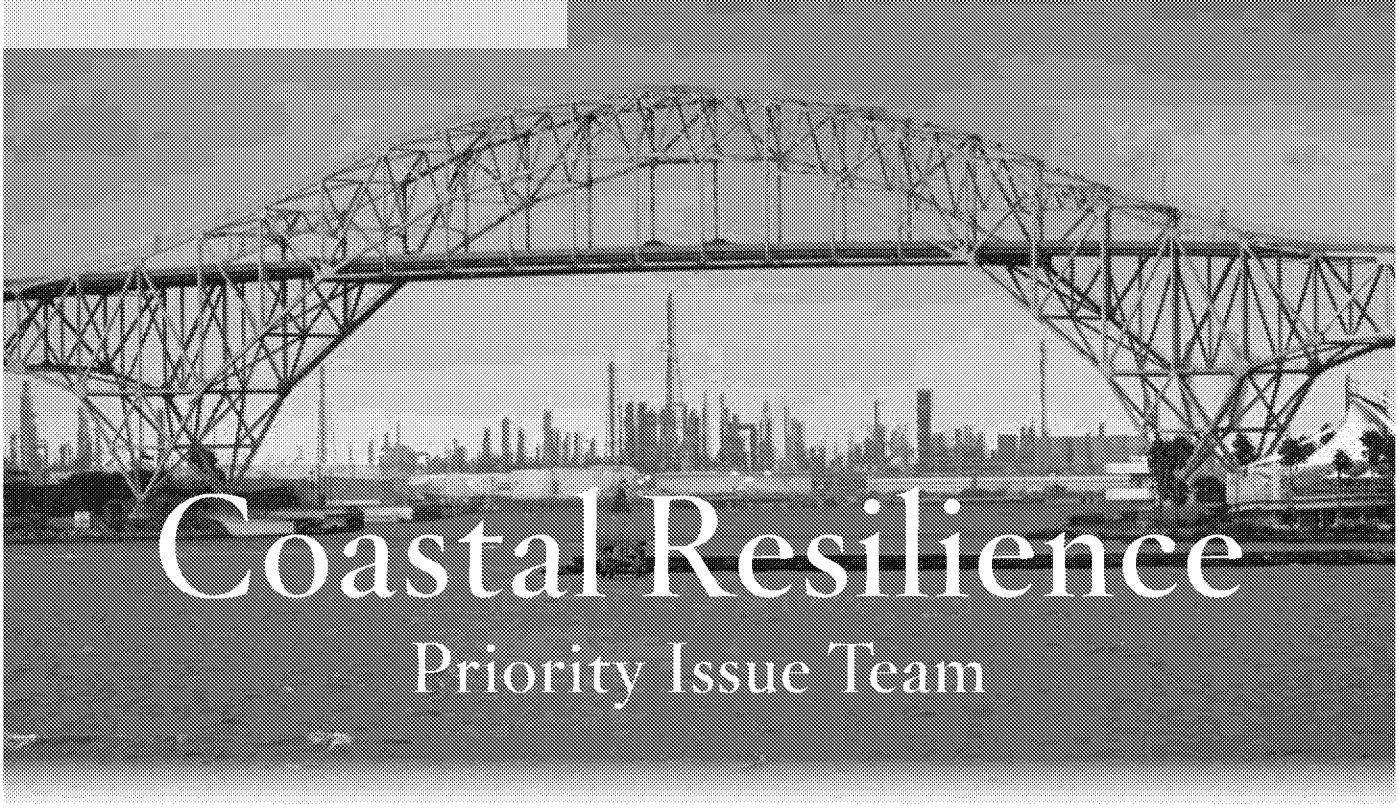
Teams have set a high standard for effective coordination and cooperation within their membership. Although each team has its own goals and focus areas, they also assist in achieving the objectives in other priority areas. In the *Governors' Action Plan III,* we have identified three initiatives as opportunities for cross-team cooperation.

- **Ecosystem Services**
- **Marine Debris**
- **Conservation, Restoration, and Resilience Planning**

Participants of the cross-team initiatives represent specific Priority Issue Teams, bring alternative perspectives, and address problems with a different approach. The teams will leverage their expertise and resources beyond their own issues to produce results. This is an exciting new venture for us and is further evidence of the commitment of our partners.







Coastal Resilience

Priority Issue Team

Jeanne Allen, US Environmental Protection Agency

Over 60 million people in the U.S. call the Gulf of Mexico their home and about a third of those live in the coastal counties and parishes. Our warm climate, low cost of living, and natural beauty continue to attract people to the region. The population of the five Gulf States is expected to increase by an additional 14 million people by 2030. With these population increases, homes, businesses, and infrastructure are at a greater risk of damage from hazards such as hurricanes, coastal storms, and flooding. Communities that prepare for short and longterm impacts and consider hazard risks in land use planning, development, and management of natural habitats are able to recover from disasters more quickly. Resilience is the capacity of human and natural/physical systems to adapt to and recover from change, such as a natural disaster.

The Gulf of Mexico Alliance Coastal Resilience Team will focus its actions on our regional ability to respond to natural and manmade hazards, including risk communication techniques and resilience assessments as well as a variety of coastal adaptation and planning methods. The Coastal Resilience Team is developing strategies and tools that, when implemented, can create safer, more resilient communities.

Team Goals

- Increase awareness and knowledge of tools and resources to assist coastal stakeholders in becoming more resilient and sustainable
- Promote the understanding of coastal risks and the availability of resilience and restoration tools for those who live, work, visit, and do business in the Gulf of Mexico
- Promote adaptation, mitigation, and restoration as strategies to preserve heritage, conserve natural resources, and support the economic viability of the coast

Risk and Resilience Communication

Provide information to Gulf Coast communities about the risks and vulnerabilities associated with coastal hazards and provide access to the tools and training necessary to increase resilience and inform restoration and adaptation decisions

Actions

- Conduct resilience workshops across the Gulf States, targeting local government representatives and land use managers, and teach them to access coastal hazard and climate change information and tools and use this information to make decisions about community planning and resource management
- Distribute English versions of state-specific resilience handbooks to residents of coastal communities
- Translate state-specific resilience handbooks for non-English speaking populations and distribute widely to non-English speaking residents of coastal communities
- Promote the StormSmart Coasts Network to residents and visitors in the Gulf region to communicate pertinent resilience information, tools, and data
- Share sea level rise modeling results from the Gulf region via the StormSmart Coasts Network, with other efforts around the Gulf
- Update resilience tools with the best available science and expand the scope of these tools to reach broader audiences

Why Do This?

Connecting residents, businesses, and local governments to relevant tools and resources is an essential step on the path toward resilience. Communication about the tools available will encourage the community to utilize this knowledge when making preparedness, response, recovery, mitigation, and development decisions.

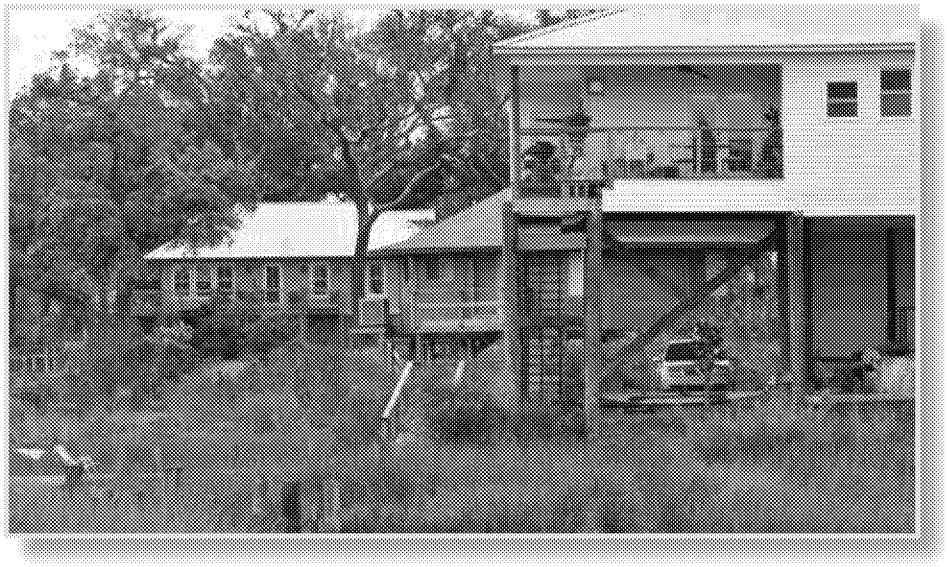
Expected Results

- Coastal stakeholders have increased awareness of resilience knowledge, tools, resources, and areas for improvement
- Communities understand incentives for engaging in risk reduction and resilience activities
- Human, environmental, and economic vulnerability of the coast is reduced as coastal stakeholders become more engaged in adaptation, mitigation, and restoration initiatives

"Gulf of Mexico resources are required to be managed and conserved for sustainable uses, suggesting an integrated approach. The GOMA Business Advisory Council is an opportunity to build consensus with government, industry and science to achieve such an approach."

– Mike Colby, Florida Coast Charters, Clearwater, FL

Mississippi-Alabama Marine Advisory Service Sea Grant Consortium



Melissa Schneider, Mississippi-Alabama Sea Grant Consortium

Risk and Resilience Assessment

Provide resilience assessment tools to assist Gulf Coast communities in understanding the risks and vulnerabilities associated with the impacts of coastal hazards and climate change so they can be prepared for and bounce forward from these events

Actions

- Assess the gaps to quantify and reduce risks within the natural, built, socioeconomic, and human health systems of Gulf Coast communities
- Expand the resilience index to include additional sectors
- Develop and promote tools to help audiences identify opportunities to improve resilience
- Support community implementation projects to improve resilience and document best practices to be shared across states
- Assist additional coastal communities with using the Resilience Index to self-assess their vulnerabilities and track progress towards greater resilience

Why Do This?

Communities that identify the nature of potential disruptions and their preparedness posture relative to these threats can be better prepared for and bounce forward from these events.

Expected Results

- Communities better understand the risks to the natural, built, social, and human health systems of Gulf Coast and as well as the resilience and restoration tools available to help them
- Residents and visitors who live, work, visit, and do business in the Gulf of Mexico utilize available resilience and restoration tools for self-assessment to reduce coastal risks and vulnerabilities
- New sectors of the community are more resilient because they have used resilience tools to assess vulnerabilities and identify opportunities to improve resilience

Resilience Planning and Adaptation

Build planning capacity among Gulf Coast communities to prepare for and adapt to a changing environment to protect human life, preserve heritage, and conserve natural resources

Actions

- Utilize the resilience toolbox techniques and strategies to provide resources to help communities implement resilience planning and adaptation
- Develop case studies on lessons learned and/or best practices on implementing resilience, adaptation, and/or restoration planning for each Gulf State and communicate the information using a variety of methods

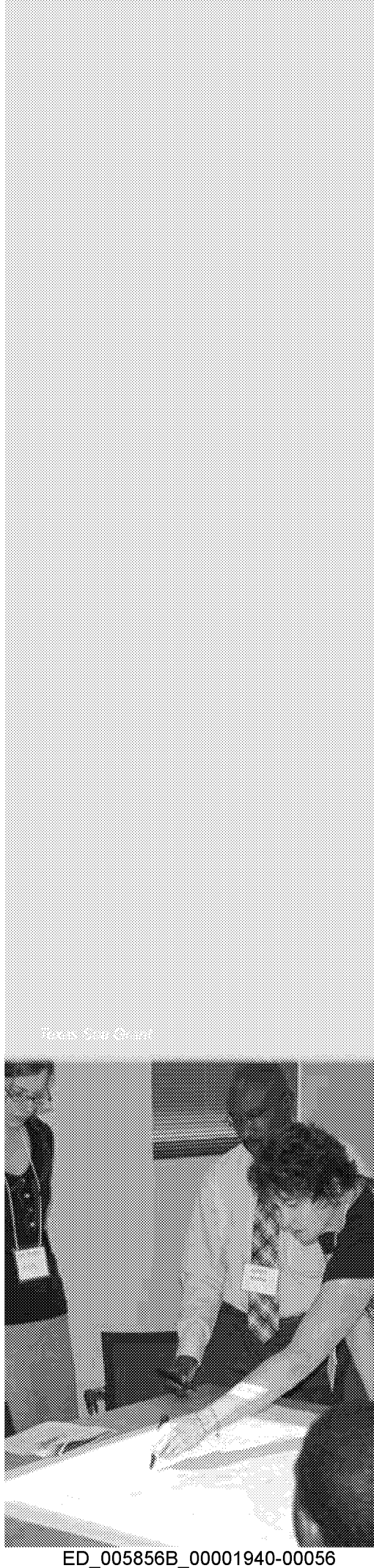
Why Do This?

Incorporating resilience into their planning process empowers communities to strengthen their built environment, their socioeconomic status, and the human health aspect as they pertain to resilience.

Expected Results

- Communities explore necessary changes in policy, by incorporating suggested planning and adaptation steps to increase resilience of communities
- Communities leverage coast-wide knowledge, tools, and resources to identify and implement solutions that increase coastal resilience
- Participating communities in the Gulf improve their Community Rating System (CRS) score and additional communities embrace and participate in the CRS to enhance floodplain management
- Gulf States meet planning requirements for Federal Emergency Management Agency Hazard Mitigation Grant Program

Heidi Stiller, National Oceanic and Atmospheric Administration



Data and Monitoring
Priority Issue Team

Monitoring is the systematic process of collecting, analyzing, and using data and information to track a program's progress toward reaching its objectives and to guide decision making. In the Gulf of Mexico, monitoring programs span a range of environmental, ecological, geomorphological, and socioeconomic topics. Many monitoring programs have been in place for years, and provide not only real-time data to support decisions like beach closures and products like hurricane predictions, but these observations also allow for assessment of long-term trends of the environment. Existing and newly emerging monitoring programs in the Gulf are necessary for evaluating Gulf restoration efforts and enhancing coastal resiliency. Programs such as these can generate a vast amount of data and information required to assess and respond to changes in the health of the Gulf ecosystem. Our ability to coordinate efforts and exchange data and information across local, state, and federal programs is critical to decision makers at all levels in the Gulf of Mexico region.

The Gulf of Mexico Alliance's new Data and Monitoring Team incorporates the monitoring efforts of the former Water Quality Team and many of the data management efforts of the former Ecosystem Integration and Assessment Team. The Data and Monitoring Team provides guidance for the coordination of monitoring efforts to discover, use, and preserve data in support of decision making for Alliance priorities. The Data and Monitoring Team will focus its actions on improving the comparability of data, developing a community of monitoring practitioners, and establishing a framework for improving how data and information are delivered to coastal managers and the public.

Team Goals

- Improve decision making through coordination and provide guidance for monitoring, mapping, and data sharing collaborations
- Enable data and monitoring integration to support Alliance priorities

Data Framework

Establish and implement a Data Management Framework for the Alliance

Actions

- Create a Data Management Plan to facilitate access to data and products from Alliance funded projects that will include meta data standards, data transparency, data sharing practices, and data quality guidance
- Use the Data Management Plan to establish and implement the Data Management Framework overseen by the Data and Monitoring Team

Why Do This?

A Gulf of Mexico Alliance Data Management Framework, implemented via a data management plan and overseen by the Data and Monitoring Team, will provide searchable metadata that describes Alliance datasets and will also rely on making the best use of data and information that already exists in numerous, distributed databases housed at government agencies, academic institutions, and non-governmental organizations.

Expected Results

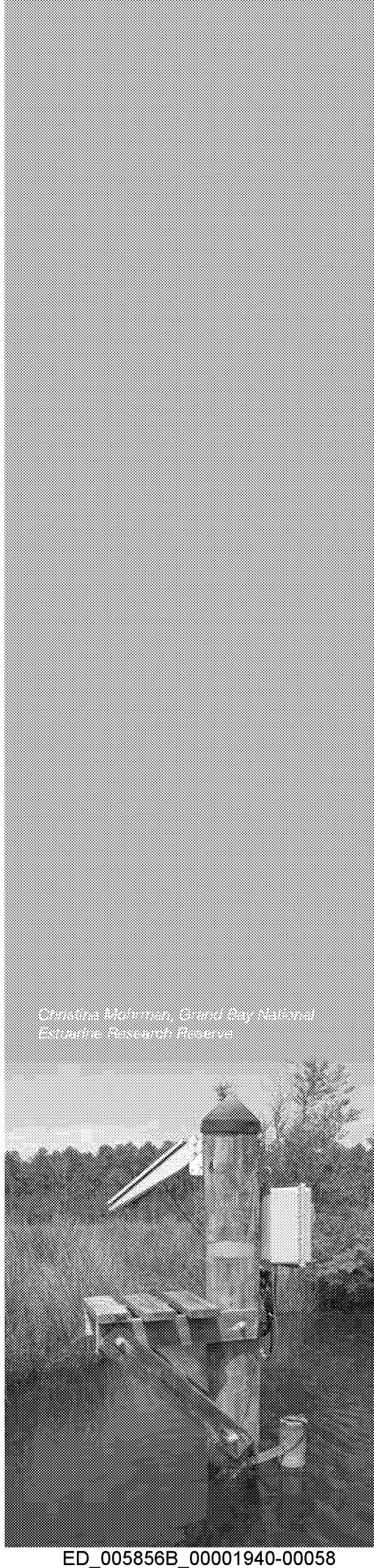
A Gulf of Mexico Alliance Data Management Framework will ensure Gulf of Mexico Alliance partners and constituents have trusted, reliable, and timely access to critical regional data and metadata on a mutually agreed uniform data standard/format. The data management framework will allow people to think holistically about their project and data design, data needs, methodology, computational and analytical needs, data storage/archiving, and product delivery.

Monitoring Community of Practice

Improve coordination, accessibility, and comparability of data and information from existing and future monitoring programs across the Gulf of Mexico through the establishment of a Monitoring Community of Practice, and, with an emphasis on Gulf ecosystem restoration, leverage this broad base of expertise in the region to standardize monitoring practices and protocols at multiple scales through consensus.

Actions

- Evolve Gulf Monitoring Network into a Monitoring Community of Practice to support Alliance priority issue team and other regional monitoring activities including: identifying and providing input and feedback on minimum monitoring standards and protocols; monitoring needs and indicators; baseline data, gap analysis/inventories, and assessments.
- Assess the feasibility of the Gulf-wide Water Quality Monitoring Network design report recommendation
- Provide access to information about monitoring activities and monitoring resources
- Explore the possibility of providing online tools to facilitate coordination of resources and activities



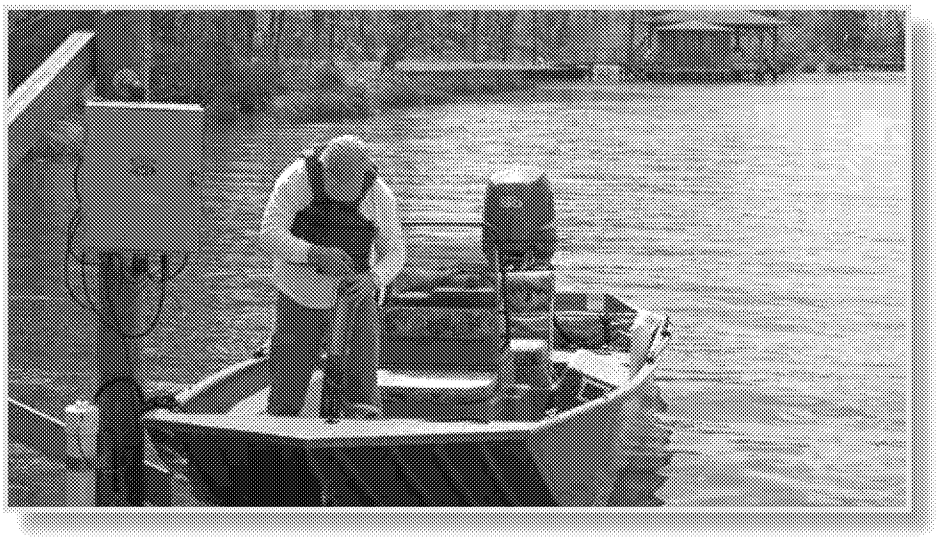
Christina Bruhmuller, Grand Bay National Estuarine Research Reserve

Why Do This?

Bringing together practitioners actively involved in monitoring the Gulf environment is key to developing a shared pool of acceptable protocols and standards needed in order to objectively assess the state of the Gulf. This work also supports the establishment of mechanisms to illustrate to the public the progress being made toward reaching comprehensive restoration and ecosystem recovery. Increased coordination among and across monitoring programs maximizes information gain at a minimum of cost.

Expected Results

A community of monitoring practitioners is established that provides expertise and input for monitoring programs especially in areas related to Gulf restoration and ecosystem recovery. The Monitoring Community of Practice facilitates the identification of standard monitoring practices and protocols and provides increased coordination among and across monitoring programs and their respective sponsors.



Weeks Bay National Estuarine Research Reserve

Gulf of Mexico Master Mapping Plan

Development of an overarching master mapping framework in the Gulf of Mexico that supports state information needs for resource management

Actions

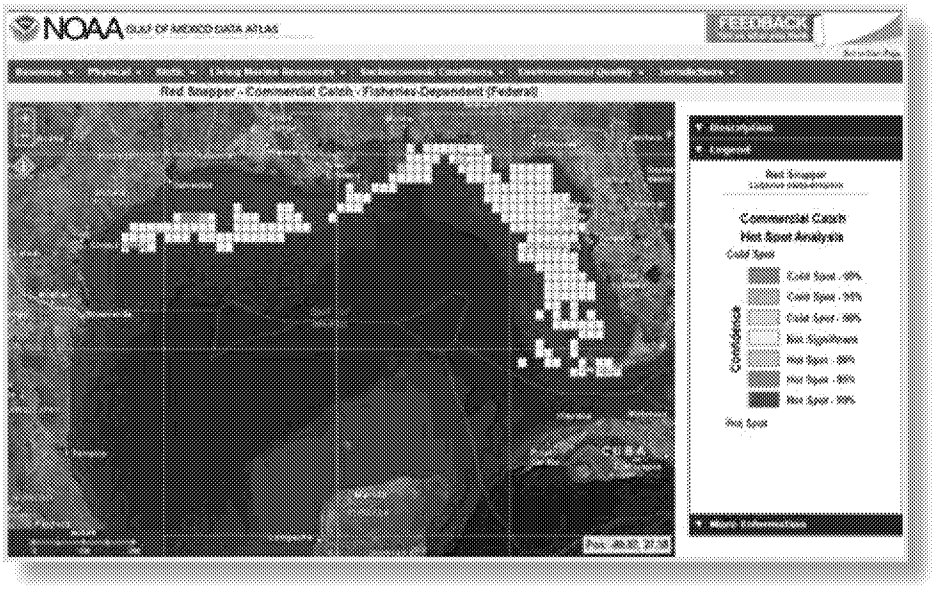
- Ensure Alliance participation in existing Gulf-wide governance frameworks that evaluate the quality of existing maps, assess gaps in coverage, and prioritize areas for habitat and water quality mapping
- Use priority areas for habitat and water quality mapping as a reference from which the Data and Monitoring PIT can make recommendations for support and actively apply for funding

Why Do This?

Implementing the Gulf of Mexico Master Mapping Plan will provide a transparent and participatory framework for sharing information related to mapping efforts, identifying, and filling gaps in existing map coverage, and enabling the use of collected data. This information is essential for determining baseline conditions, subsequently detecting change over time, and informing the work of multiple priority issue teams. The Master Mapping Plan will facilitate access to actionable data products and be a bridge between information and application.

Expected Results

The Master Mapping Plan will provide a roadmap to baseline information on landscape, seascape, and waterscape habitats, as well as water quality, in the Gulf of Mexico region to evaluate changes through time. To this end, the Master Mapping Plan will leverage governance structures in the emerging community of practice, facilitate a mapping consortium, and provide a forum for sharing schedules of mapping campaigns in order to increase efficiency.



NOAA National Centers for Environmental Information

"The Gulf of Mexico Alliance has been key to the success in addressing complex regional issues affecting the Gulf, by bringing together a broad array of agencies and programs including Sea Grant to foster collaborative issue identification and problem solving."

– Karl Havens, Director, Florida Sea Grant College Program Professor
University of Florida IFAS

Pierce Cobb, Dauphin Island Sea Lab

Education and Engagement

Priority Issue Team

The Gulf of Mexico is fortunate to have many environmental education resources including expertise from local, state, and federal governments; non-governmental organizations; and academic institutions. These organizations have been vital partners of the Gulf of Mexico Alliance throughout the past 10 years, allowing for diverse education, outreach, and engagement resources on regional priority issues.

Because stewardship and improved science-based decision making are relevant to all Alliance activities, the Gulf of Mexico Education and Engagement Team will focus on providing support to the other five priorities and three cross-team initiatives. Team members will use a broad spectrum of environmental education approaches to expand the public's environmental literacy and stewardship of the Gulf of Mexico. The Education and Engagement Team is committed to engagement that leverages resources, builds partnerships, and results in measurable impacts.

Team Goal

- Engage and educate people to become stewards who enhance the environmental, ecological and economic health of the Gulf of Mexico

"GOMA continues to do an excellent job of integrating research and development with resource management agencies, non-governmental organizations, and coastal communities to communicate a resource based approach for the stewardship of the Gulf of Mexico ecosystem."

– Steve Ashby, Co-Director
Northern Gulf Institute

Communicate Alliance Priority Issues

Assist Priority Issue Teams and cross-team initiatives with their education and engagement efforts to improve communication and collaboration

Actions

- Expand coordination of cross-team themes
- Share Priority Issue Team products with internal and external audiences
- Standardize Gulf of Mexico Alliance branding and delivery of Alliance team products
- Expand partnerships and provide assistance to other Gulf of Mexico Alliance teams
- Create audience-specific educational products or programs that translate Alliance Priority Issue team information into understandable messages to increase awareness of the value of Gulf natural resources

Why Do This?

Integrating education and engagement into all Alliance goals enables translation, consistency, and effective Alliance programming. Informed and involved audiences better understand the significance of projects and are likely to be more supportive of future priority issue activities.

Expected Results

Informed and involved audiences better understand the value of Gulf natural resources, and exhibit behaviors that conserve those important resources.

Simona Duque, Siesta Key Beach

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Promote Public Awareness

Support public awareness and stewardship activities that include various approaches for creating a conversation with Gulf communities

Actions

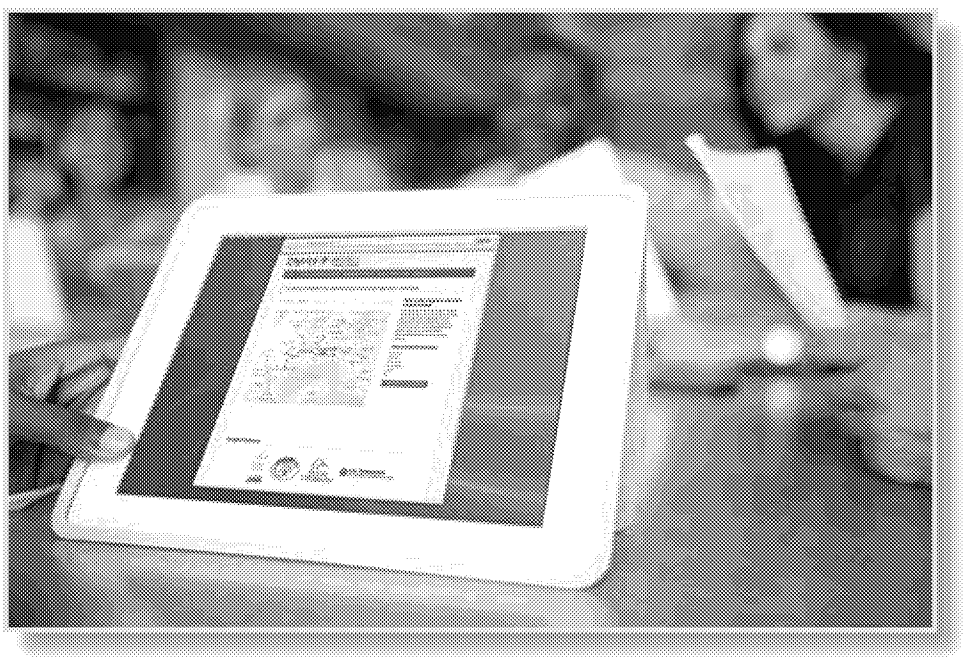
- Create public awareness and stewardship opportunities for audiences within the Gulf of Mexico and broader Gulf watershed
- Support partner workshops as well as community and volunteer events
- Distribute parallel messages across the states with uniform public awareness campaigns
- Promote Gulf environmental literacy on Alliance social media, website, and through traditional media outlets
- Explore new and unique ways to disseminate Alliance messages and to receive feedback from Gulf communities

Why Do This?

The key to successful stewardship is connecting quality of life to a healthy Gulf of Mexico. In a changing world, information must be shared using an increasing number of methods as people are communicating in both new and traditional ways.

Expected Results

Audiences within both the Gulf region and broader Gulf watershed are aware of the importance of the natural resources within our region and of the actions they can take to conserve and protect those resources.



Education and Engagement Network

Increase education and engagement network collaboration to reduce duplication, leverage resources, and expand local, regional, and national opportunities

Actions

- Create an opportunity for a face-to-face Gulf of Mexico educators conferences and meetings
- Improve team communication and peer-to-peer learning
- Expand partnerships with education and engagement organizations, including non-governmental organizations
- Develop Alliance educational partnerships with non-educational organizations, such as business, non-profits and industry

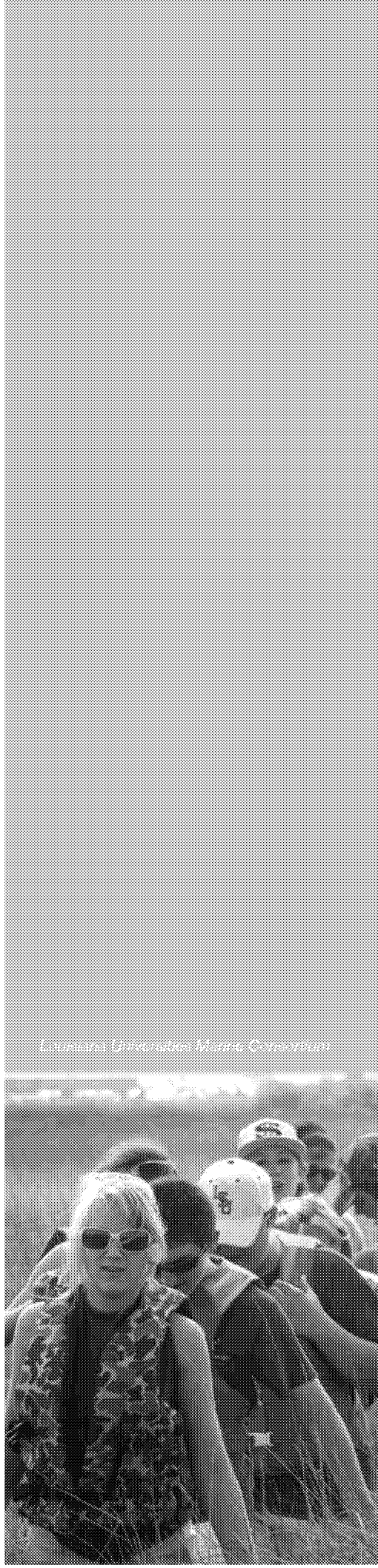
Why Do This?

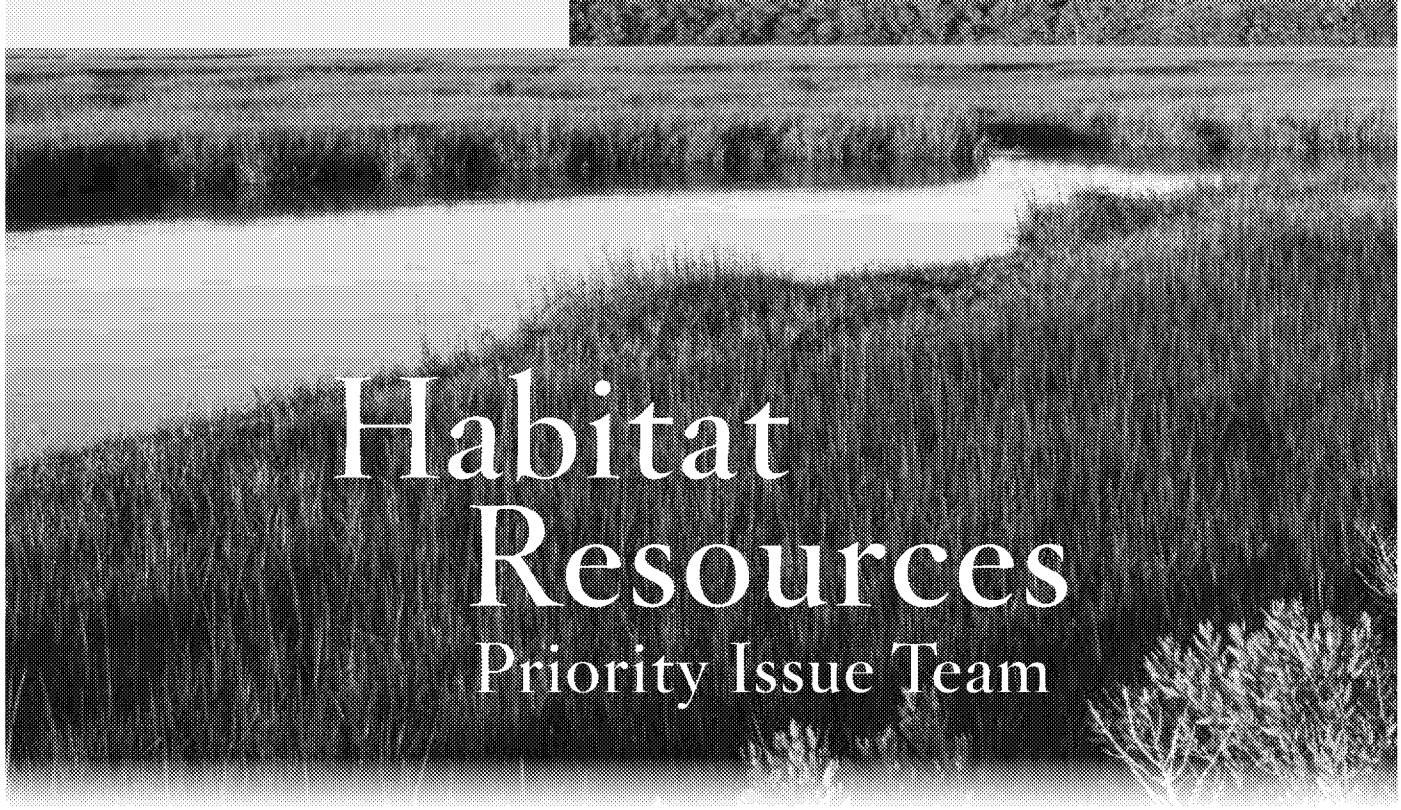
The multiplier effect of partnering with other organizations that have similar or complementary interests is very important. In addition to powerful reinforcement when people hear the same message from different sources, these partnerships provide synergy that often leads to new projects and programs that could not have been accomplished by any one organization.

Expected Results

Education professionals work together on a regular basis to reduce duplication, leverage resources, and build capacity to communicate with their target audiences about the economic and ecological health of the Gulf.

Mark Berte, Alabama Coastal Foundation





Habitat Resources
Priority Issue Team

Gulf of Mexico coastal areas have more than half of the coastal wetlands within the adjoining 48 states, and 97% (by weight) of the commercial fish and shellfish landings from the Gulf of Mexico are species that depend on estuaries and their wetlands at some point in their life cycle. Our region is rich in habitats that provide critical structural integrity to our coasts, nourish and sustain fisheries and wildlife populations, protect the health of our bays, and sustain local and national economies. Riparian buffers, freshwater and tidal marshes and swamps, mangroves, oyster reefs, seagrasses, and intertidal flats located along our coastal bays, beaches, and rivers provide essential habitat for fisheries and wildlife, protect water quality, sequester carbon, and help stabilize shorelines. Coastal habitats have suffered significant losses and degradation over the past several decades and are continually threatened by increasing coastal population, development, changing climate conditions, erosion, and sea level rise.

The Gulf of Mexico Alliance Habitat Resources Team will focus its actions on developing tools and data regarding habitat assessment, living shorelines, sediment management, and sea level rise. This team will also take the lead on the Comprehensive Restoration and Resilience Planning and the Ecosystem Services Assessment Cross-Team Initiatives.

Team Goals

- Increase the availability and utilization of habitat assessment data and information to coastal stakeholders
- Increase awareness and implementation of living shoreline alternatives in coastal communities
- Support the development of robust regional sediment management and beneficial use programs at the local, state, and regional scale
- Promote understanding of the capabilities and uses of sea level rise and storm surge models

Habitat Assessment

Increase the availability of habitat data and information to coastal stakeholders to better inform coastal management decisions, improve disaster response, and develop comprehensive restoration and protection action strategies

Actions

- Identify priority Gulf habitats to be assessed through consultation with the resource management community and Gulf stakeholders
- Coordinate and conduct priority habitat assessments and trend analyses across the U.S. Gulf coast
- Disseminate priority habitat assessment and trend data and summary findings to Gulf stakeholders to inform management and restoration actions

Why Do This?

Updated status and trends data on Gulf coastal habitats are important to inform responsible site-specific and regional coastal management decisions to maintain and restore our regional natural resources and the goods and services we derive from them.

Expected Results

A broad range of coastal stakeholders and managers utilize priority habitat assessment and trend data to inform management decisions to maintain our regional natural resources and the goods and services we derive from them.

Living Shorelines

Develop and disseminate information and tools for the planning and implementation of living shorelines projects, specifically restoring vegetated shorelines and/or placing rock or other materials in a way that preserves natural coastal processes and enhances shoreline habitats while addressing erosion, to Gulf coast stakeholders interested in alternatives to traditional armoring for shoreline protection and restoration

Actions

- Directly advance and coordinate the development of living shoreline information, project planning, and implementation tools
- Work with federal and state agencies to facilitate implementation of living shoreline options as the generally preferred, least-damaging, and practicable alternative to traditional shoreline armoring for erosion protection
- Develop recommendations for standardized metrics of living shoreline projects to ensure consistent monitoring of projects
- Coordinate the transfer of living shoreline information and tools to Gulf stakeholders, including resource managers, federal and state agencies, contractors, and homeowners
- Work with the U.S. Army Corps of Engineers to propose a new streamlined nationwide permit for living shorelines

Why Do This?

Property owners seeking to protect real estate from coastal erosion tend to rely upon the installation of structures which displace or damage coastal habitats. Fortunately, nature based living shoreline techniques provide effective erosion control. The Alliance can help protect and restore coastal habitats by providing increased access to information about living shoreline techniques and successful projects and by encouraging regulatory and non-regulatory incentives.

Expected Results

Natural shoreline habitats and the ecosystems services they provide are protected and restored through increased utilization of living shoreline techniques.

Chip Worley, US Army Corps of Engineers

Regional Sediment Management

Promote the widespread adoption of regional sediment management activities across the Gulf Coast through the development of information and tools that inform stakeholder management of sediment resources

Actions

- Conduct studies of policy and technical challenges to the implementation of regional sediment management and beneficial use of dredged materials and promote the implementation of regional sediment management practices
- sConduct outreach and education of regional sediment management and beneficial use of dredged material information and technology transfer to Gulf stakeholders

Why Do This?

Sustainable and effective ecosystem restoration and improved coastal resiliency requires more effective use of sediment resources. Between 2004 and 2014, the Habitat Resources Team completed an advisory framework for sediment management and several local/regional data development and planning efforts. We will continue regional collaboration and practical support of improved sediment management practices around the Gulf to catalyze and advance Gulf restoration.

Expected Results

Sediment resources are more efficiently and effectively managed across the Gulf coast in a manner that, to the maximum extent possible, balances the costs of management decisions with the benefits of wise use of those resources to the natural and human environment.

Sea Level Rise

Serve as a coordination point for understanding sea level rise models currently used across the Gulf Coast

Actions

- Compare the capacities of the suite of sea level rise-driven landscape change models currently used across the Gulf Coast
- Provide stakeholders with information about the models currently being used to predict environmental change for sea level rise across the Gulf Coast
- Support and/or implement research and development actions on technical improvements for input datasets to sea level rise models in order to increase their utility to Gulf coast resource managers (commissioning and coordinating secondary analyses based on available sea level rise-driven habitat change models)
- Facilitate dissemination and understanding of the ever-improving set of sea level rise models and tools between researchers, managers, and stakeholders

Why Do This?

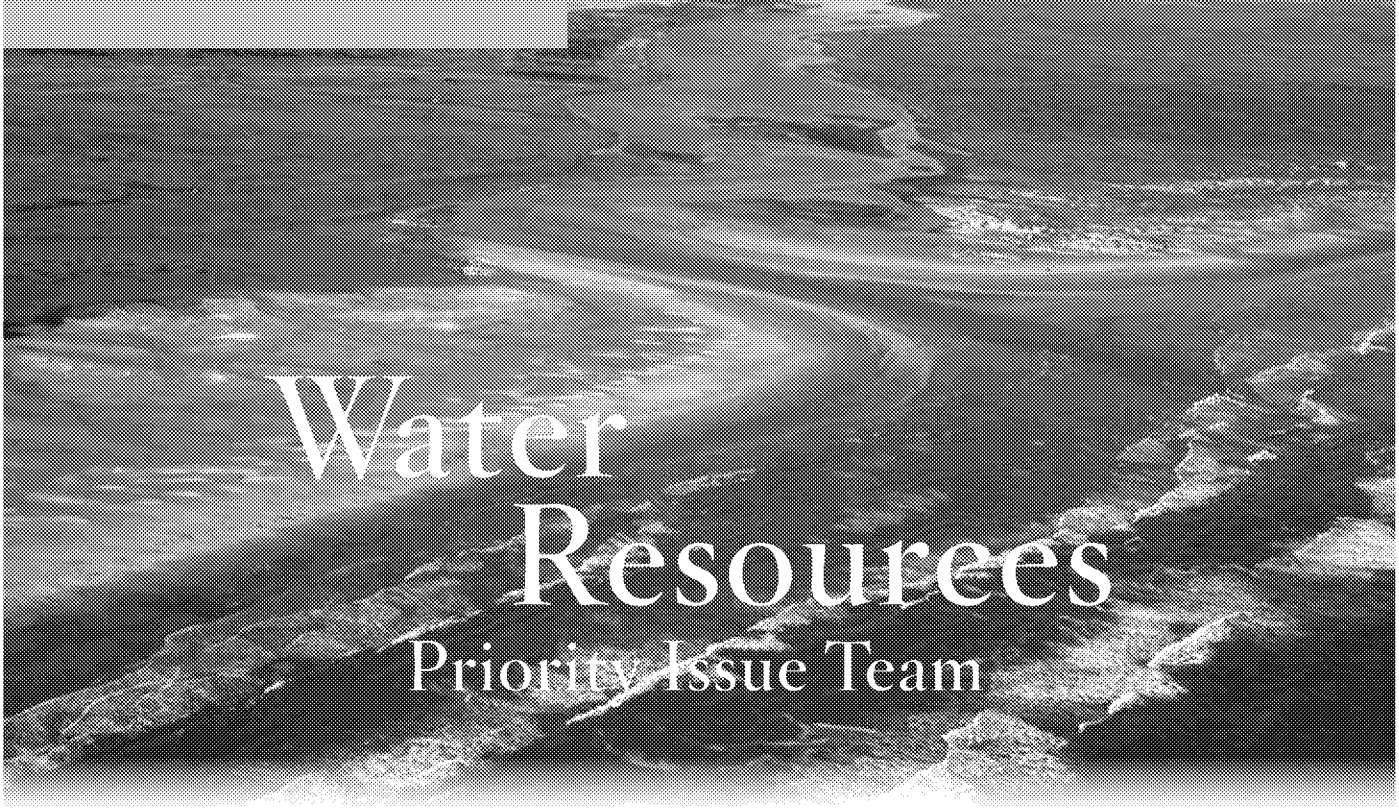
Adoption of sea level rise predictive models for decision-making purposes should ideally be based on multiple criteria such as model capacity, cost, model domain and resolution, and computational needs. Incorporation of more accurate sea level rise information should increase the effectiveness, longevity, and resilience of habitat restoration actions.

Expected Results

Stakeholders will understand what sea level rise models are most useful for their needs, and the availability, accuracy, and utilization of sea level rise data and modeling will be increased to inform coastal habitat restoration, conservation, and resilience investments.

"The Teams are the strength and value of GOMA, serving as a mechanism to help partners better communicate priorities with state and federal agencies."

– Quenton Dokken, Executive Director
Gulf of Mexico Foundation



Water Resources Priority Issue Team

Ben Mieremet, NOAA

The Gulf of Mexico region, both a popular residential area and an incredible destination for tourists, provides beautiful beaches, exceptional seafood, and numerous recreational activities such as boating, fishing, swimming, and snorkeling. It is estimated that tourism supports 1.7 million jobs within the region. In addition, commercial fishing in the Gulf is a tremendous asset worth over $900 million. As we struggle to deal with water resource challenges at local, regional, national, and even global scales, experience continues to demonstrate how issues such as water quality, water quantity, water sustainability, human health risks, and aquatic health are all connected. Furthermore, we realize how these water resource issues ultimately affect the Gulf economy.

The Water Resources Team will focus its efforts on a wide range of key water resource concerns that affect the region. These may include pathogens, harmful algal blooms, nutrient pollution, hypoxia, freshwater inflows, water resource sustainability, and additional emerging water resource issues in the Gulf. The team will work to explore and advance the understanding of the connections among these topics. In addition, the team will seek solutions to provide improved protection of human health and aquatic life. Team efforts will also aim to increase awareness of how water resources (quality, quantity, and sustainability) are directly related to both human and aquatic health within the region, and how all of these influence the economic health of the region. Understanding the relationships among these issues is essential for enhancing and sustaining this vital resource.

Team Goals

- Protect human health, aquatic health, and economic health within the Gulf of Mexico by applying and advancing science and technology, improving education and overall environmental awareness, and enhancing partnerships
- Identify, prioritize, and pursue additional data and research needed to better characterize, understand, and reduce potential threats to human health or aquatic life
- Identify linkages between water quality, water quantity, water resource sustainability, human health, aquatic health, and economic health
- Support ongoing local, regional, national, and international efforts related to protecting and/or improving water resources within the Gulf of Mexico

Human Health

Increase protection of human health by identifying the linkages between water resources and potential exposure to health risks (from either natural or anthropogenic sources) and by exploring and implementing better methods of detecting, characterizing, preventing, controlling, and mitigating these risk

Actions

- Explore the development of improved methods for the detection of potential hazards that pose a threat to human health
- Implement projects to reduce risks to human health associated with either natural hazards or anthropogenic sources
- Increase awareness of health risks associated with water resources by targeting various audiences across the region, which could include Gulf Coast residents, local communities, local governments, and/or local businesses
- Promote community engagement through local stewardship activities
- Support collaboration at each level (local, state, regional, and international) to reduce risks to human health within Gulf waters
- Explore opportunities for collaboration with Mexico and other nations bordering the Gulf related to shared human health concerns

Why Do This?

Before potential threats to human health can be effectively managed, linkages between exposure and susceptible water resources must be explored and understood. Clarifying these linkages supports the development of improved methods to provide better protection of human health.

Expected Results

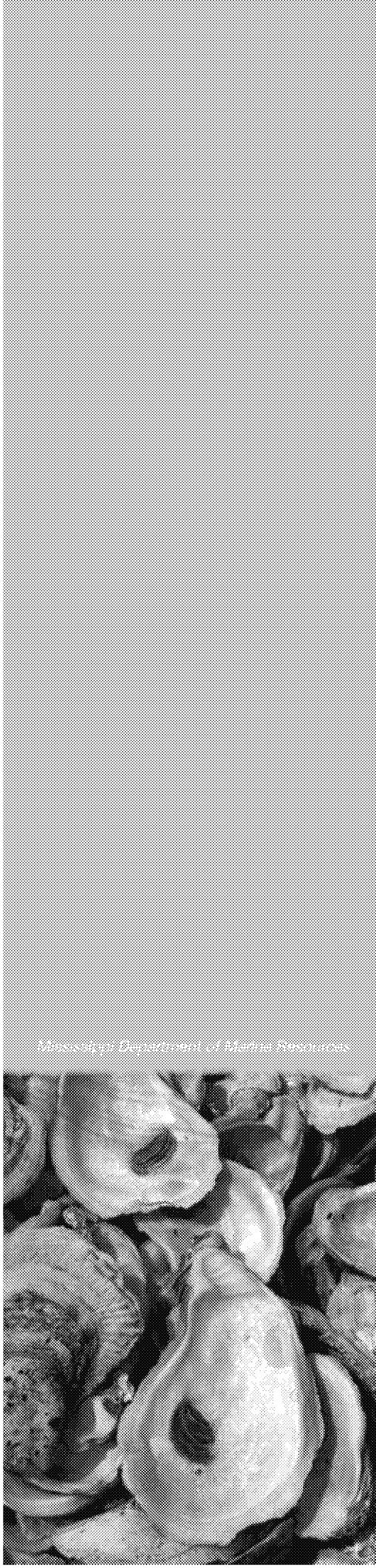
The relationship between water resources and potential human health risks will be better defined, allowing for the development of improved methods to prevent, detect, and manage these risks.

Aquatic Health

Improve protection of aquatic health by identifying the linkages between water resources and aquatic life and by developing tools and implementing projects to characterize, assess, and decrease negative effects (from either natural or anthropogenic stressors) on aquatic life in Gulf ecosystems

Actions

- Improve existing tools or develop new tools to better characterize and assess aquatic health in Gulf ecosystems
- Implement projects to reduce impacts from stressors on aquatic life in Gulf ecosystems
- Increase awareness of the benefits of healthy aquatic life in Gulf ecosystems
- Promote community engagement through local stewardship activities
- Support collaboration at every level (local, state, regional, and international) to protect and restore aquatic health within Gulf waters



Mississippi Department of Marine Resources

Why Do This?

To protect aquatic health in Gulf ecosystems, the linkages between water resources, potential stressors, and how these stressors affect aquatic life must be established. Defining these relationships will lead to the development and implementation of more effective efforts to restore and protect aquatic health.

Expected Results

A better understanding of the effects of stressors on aquatic life will support the implementation of more effective efforts to restore and protect aquatic health.

Julie Dennis, Florida Department of Economic Opportunity

Economic Health

Protect the economic health within the Gulf of Mexico by identifying and understanding the linkages between healthy water resources and a healthy Gulf economy

Actions

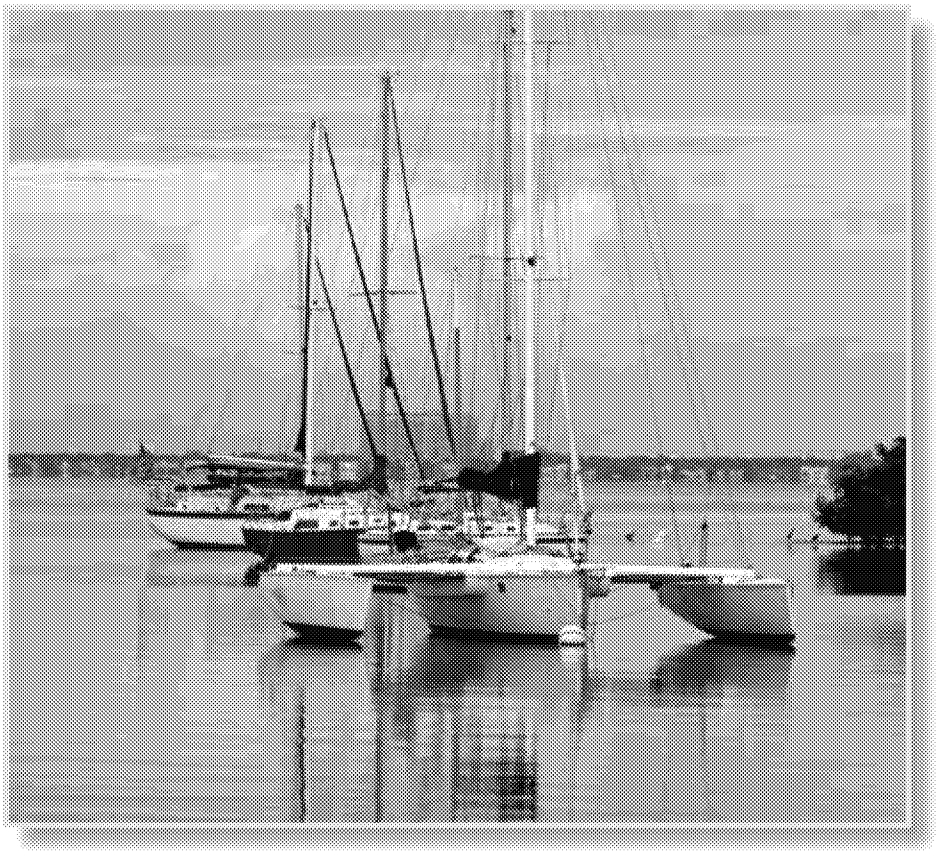
- Explore how water quality, water quantity, water sustainability, threats to human health and negative effects on aquatic life ultimately impact the Gulf economy
- Target a variety of audiences to increase awareness regarding the connection between healthy water resources and a healthy Gulf economy
- Explore opportunities for pilot projects to demonstrate how improvements to water resources can positively affect economic drivers

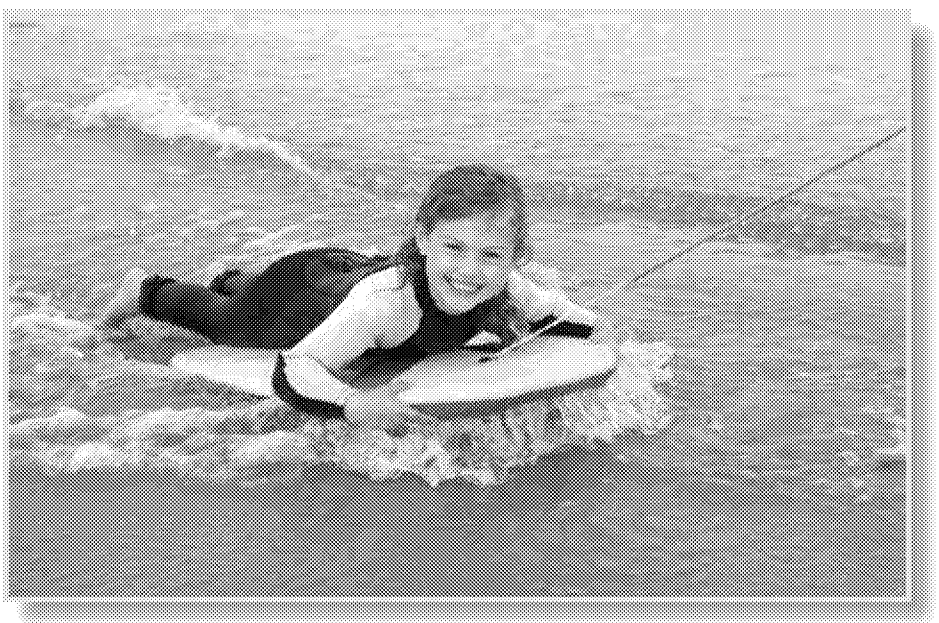
Why Do This?

The Gulf of Mexico is a tremendous asset to the region and to the nation. To protect Gulf economies and maintain this vital resource, it is essential to acknowledge the connections between human health risks, impacts to aquatic life, and a healthy economy.

Expected Results

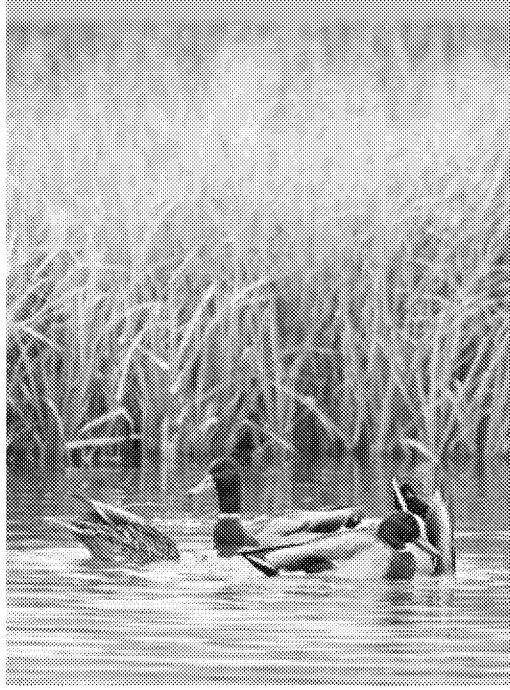
The fundamental connections between water resources and the Gulf economy will be characterized allowing Gulf stakeholders better understand how water quality, water quantity, water resource sustainability, human health, aquatic health, and a healthy economy are interrelated. Demonstrating that improvements to water resources can be directly linked to economic benefits will provide further support and justification for restoration and protection efforts in the Gulf of Mexico.

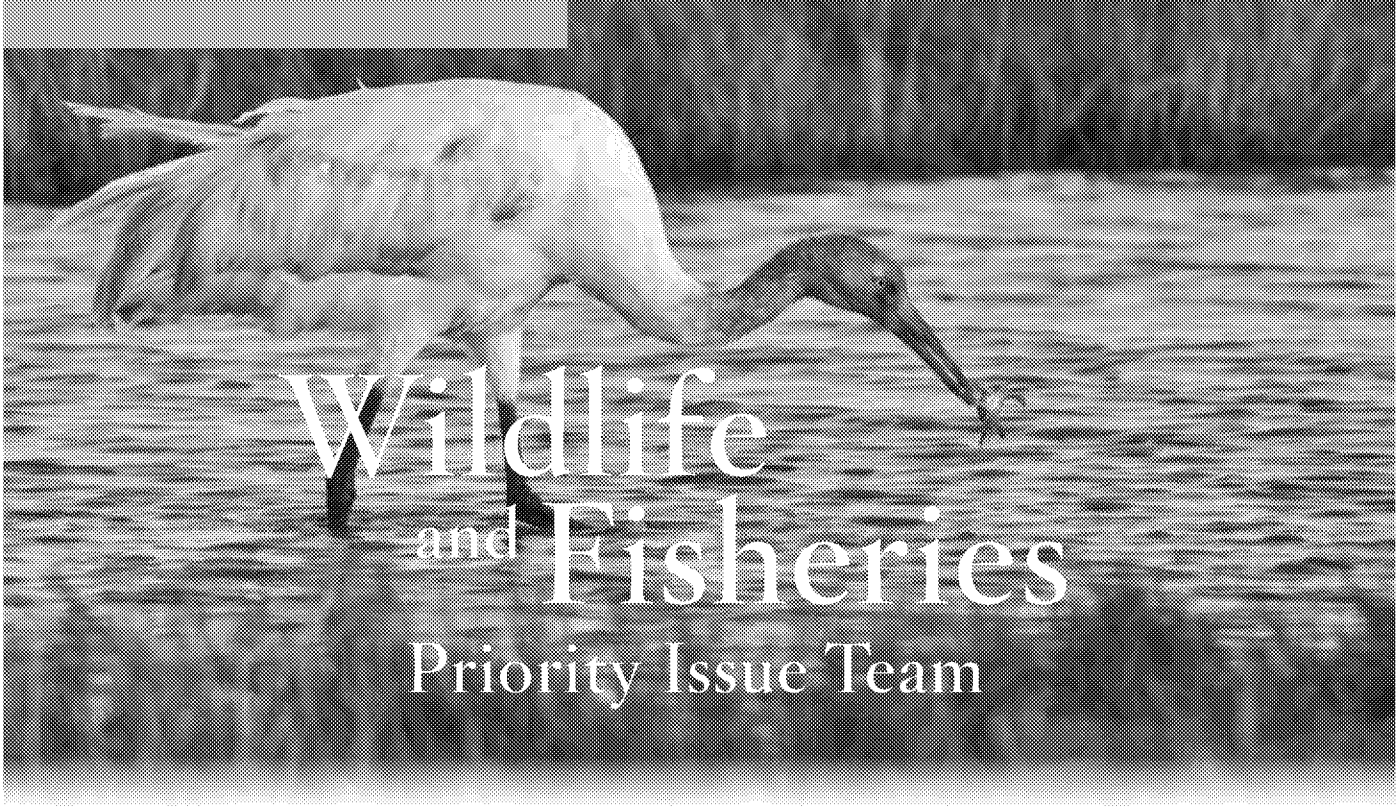




"Water quality is a primary concern for us as well as other states, and GOMA allows us to build relationships and leverage knowledge and expertise in that area."

– Toby Baker, Commissioner
Texas Commission on Environmental Quality





Wildlife and Fisheries Priority Issue Team

Sherry Halbrook, Mission-Aransas National Estuarine Research Reserve

The Gulf of Mexico is the ninth largest body of water in the world and is home to over 15,000 species of marine wildlife. From its extensive salt marshes, bays and estuaries, coral reefs, and deep waters found off the continental shelf, the Gulf provides habitat and sustenance to all components of the ecosystem. Many of the species are both recreationally and commercially important including shrimp, red snapper, oysters, crabs and menhaden. It is also home to 29 marine mammal species, five species of sea turtles, and supports over 400 species of birds that depend on the Gulf region for breeding, migrating, and wintering.

The Gulf of Mexico Alliance Wildlife and Fisheries Team will focus on identifying gaps in existing research and restoration efforts; work with other Alliance Teams to integrate wildlife and fisheries data, information and priorities; and coordinate and support regional efforts to protect and conserve Gulf wildlife and fisheries.

Team Goals

- Work to understand and support diverse wildlife and fisheries populations to sustain a resilient Gulf of Mexico ecosystem
- Inform conservation and policy decision makers through collaboration with the other Gulf of Mexico Alliance teams

"The Gulf of Mexico Alliance serves as a model of inclusion and leveraging. A forum that brings together decision makers, scientists and practitioners to address gulf-wide restoration priorities. Over the last decade, our relationship with GOMA has enhanced our efforts to achieve healthy and sustainable populations of fish and wildlife across diverse Gulf landscapes and administrative boundaries. We are proud to be a part of Action Plan III and look forward to continued collaborative restoration in the Gulf of Mexico."

– Linda Walker, Senior Advisor for Gulf Restoration, US Fish and Wildlife Service

Status and Trends

Provide tools and information regarding the status and trends, threats, and habitat linkages of wildlife and fisheries species to better support decision-making across the Gulf of Mexico region

Actions

- Compile and synthesize existing information regarding status and trends, threats, and habitat linkages of wildlife and fisheries species to identify key data gaps
- Prioritize research and monitoring needs based on proven methods and identified key data gaps
- Identify priority short and long-term monitoring programs
- Identify and characterize linkages among focal species and their habitats

Why Do This?

Effective resource management is dependent on access to data resources and on the ability to design and implement future data collection efforts in a rational and cost effective manner.

Expected Results

Status and trend results should help develop baseline conditions that will direct research and monitoring activities and inform management decisions. Wildlife and Fisheries managers will have a better understanding of wildlife and fisheries populations and an ability to improve future management.

Collaboration

Collaborate with other Gulf of Mexico Alliance teams and partners to share knowledge and inform actions that impact wildlife and fisheries

Actions

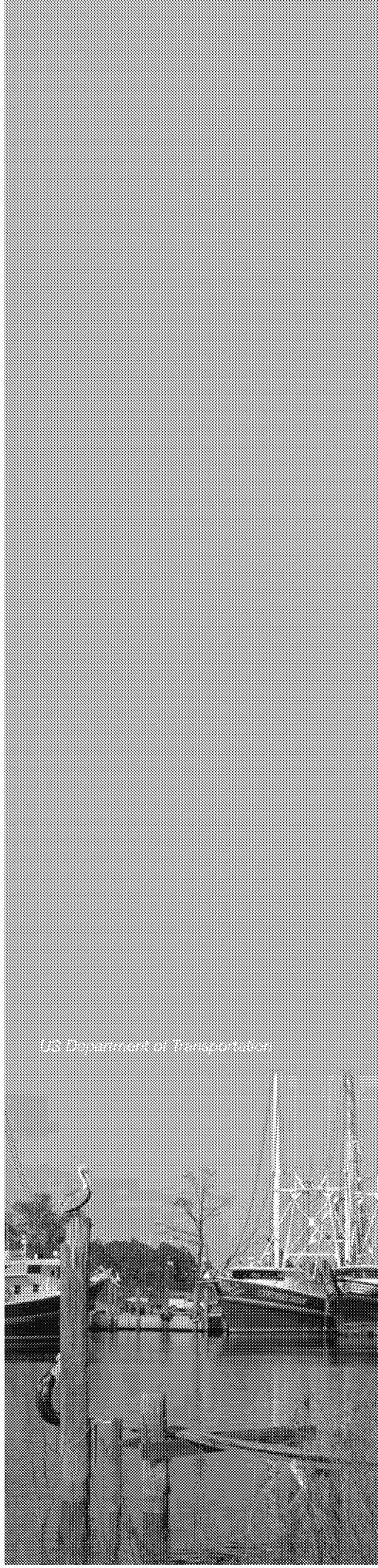
- Establish communication with other teams as well as regional restoration efforts related to wildlife and fisheries priorities
- Work with the Education and Engagement Team to translate data and information into easily understood formats for multiple audiences
- Work with the Habitat Team to develop information and tools for the planning and implementation of habitat related projects
- Work with the Data and Monitoring Team to coordinate monitoring to provide a better understanding of wildlife and fisheries population status

Why Do This?

Wildlife and fisheries management does not occur in a vacuum and as such it is vital that we collaborate with the other Gulf of Mexico Alliance teams, state and federal partners, non-governmental organizations, and other conservation minded groups.

Expected Results

By collaborating with others, we expect to reduce duplication, leverage assets, and improve the flow of information between groups.



Conservation

Support and enhance efforts to protect and conserve wildlife and fisheries in the Gulf of Mexico

Actions

- Identify relevant Gulf-wide conservation issues and coordinate planning
- Identify key areas for conserving priority species, focusing resources on where the greatest results can be achieved
- Engage key partners that work with wildlife and fisheries, and assist them to overcome institutional barriers
- Identify multi-jurisdictional needs and act as a broker to align projects to find economic and ecological benefits
- Utilize data and information to inform management practices and priorities that support conservation needs.

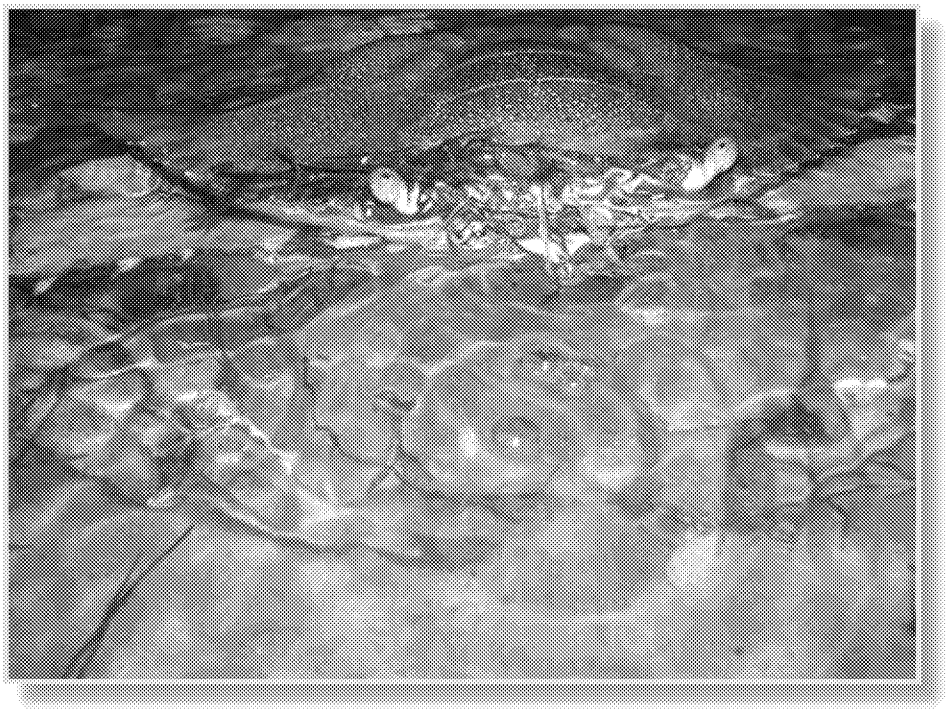
Why Do This?

Wildlife and fisheries populations do not begin and end at state and national borders. To effectively conserve and manage Gulf of Mexico species that have economic, cultural, or aesthetic values, there needs to be coordination across political boundaries.

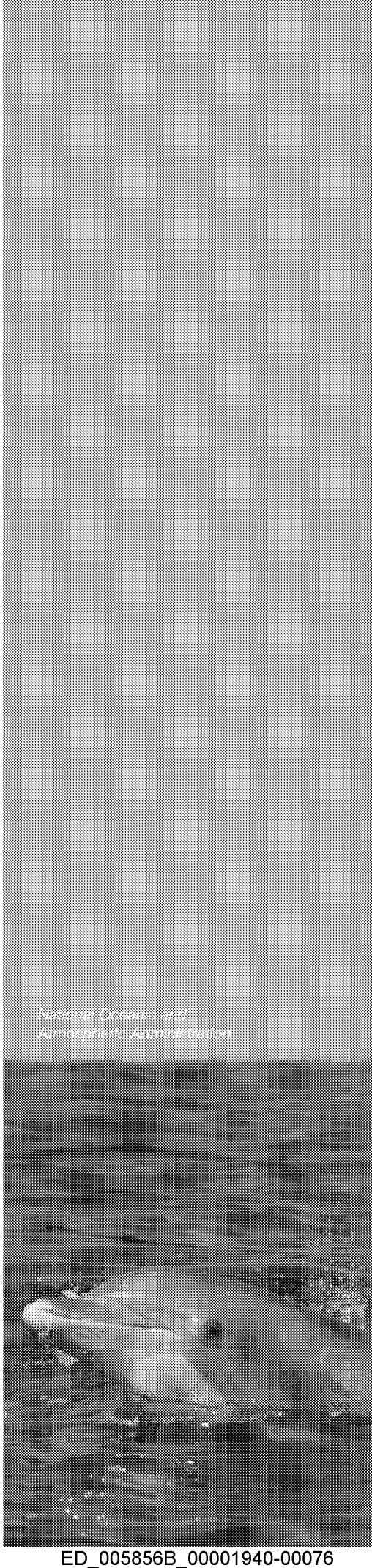
Expected Results

Wildlife and fisheries management is founded in solid science and meets stakeholder needs. Partners comprehensively manage wildlife and fisheries across state and federal boundaries.

US Fish and Wildlife Service



Lee Yokel, Dauphin Island Sea Lab



National Oceanic and Atmospheric Administration

Ecosystem Services Assessment

Cross-Team Initiative

The Gulf of Mexico is a bountiful provider. The Gulf of Mexico Alliance wants people to realize the true value of the Gulf ecosystem. The Alliance therefore has established the Ecosystem Services Assessment Cross-Team Initiative to enhance the use and communication of ecosystem services science and tools for citizens, scientists, and practitioners. Ecosystem services are the benefits people obtain from the natural environment, including food, recreation, and storm protection.

Cross-Team Goal

The goal of this cross-team initiative is to advance the identification, measurement, and communication of coastal and marine ecosystem goods and services for better management of regional resources and the building of resilient communities.

Actions

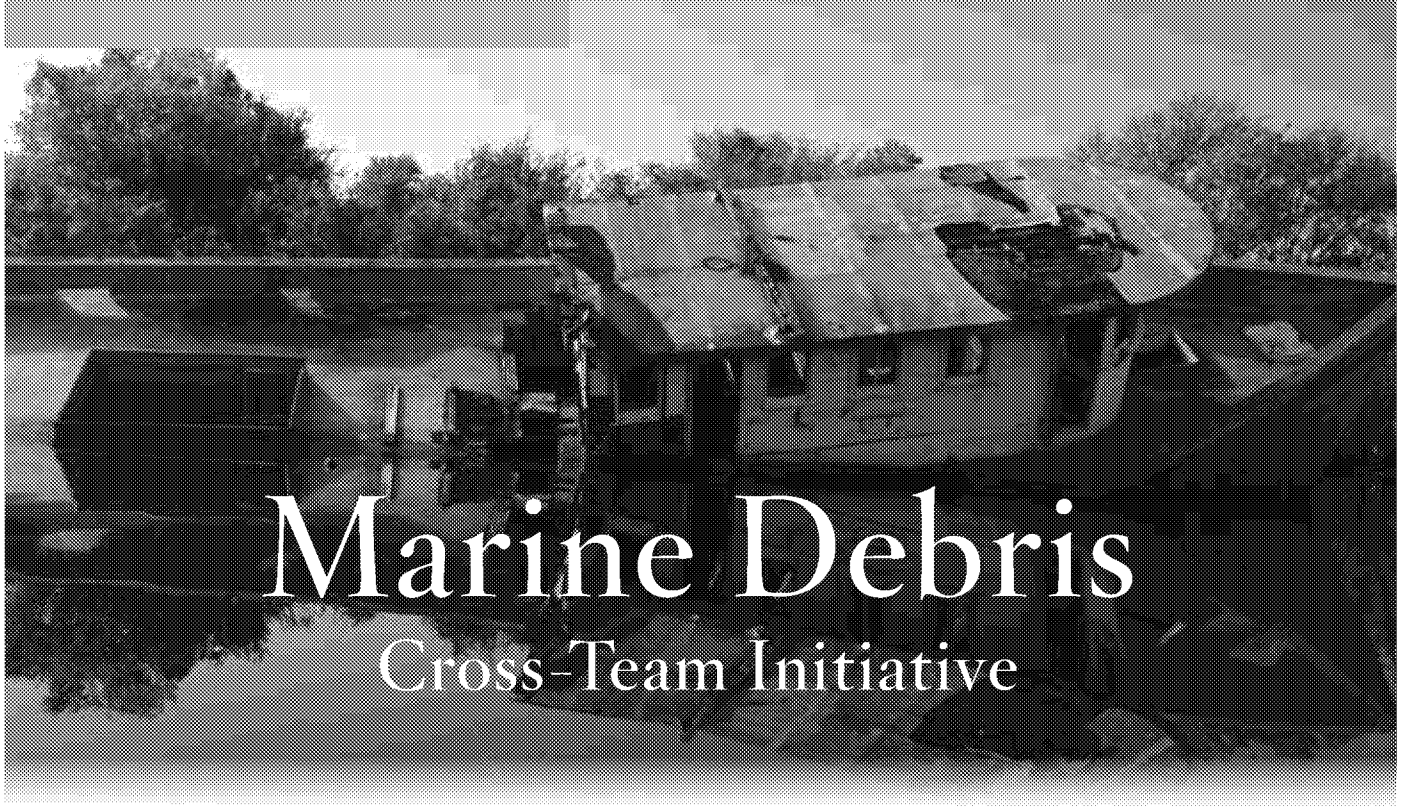
- Develop a stronger understanding of the connections between the natural environment, ecosystem services, and human well-being
- Enhance the communication of ecosystem services science and tools
- Use ecosystem services knowledge to inform the decision-making process

Why Do This?

Due to the increasing natural and anthropogenic pressures on our coastal and marine environments, today there is a greater call to understand the relationship between environmental and human well-being through the lens of ecosystem services for the formulation and implementation of effective management and policy directives. Ecosystem services provide a way to communicate the impact of our investment in conservation and restoration efforts on the community, thus bridging the gap between science and application.

Expected Results

Citizens, scientists, and decision makers will understand ecosystem services and begin to utilize available tools and knowledge to make informed coastal resource management decisions that ultimately enhance individual and community well-being.



Marine Debris

Cross-Team Initiative

Kim Albins, NOAA Marine Debris Program

Marine debris is any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment or the Great Lakes. Marine debris can be small, like a cigarette butt tossed on the beach, or large, like an abandoned vessel. While marine debris is a global problem requiring international cooperation, the Gulf of Mexico Alliance can help address a broad range of issues and coordinate on the local, state, and regional scale to help alleviate negative impacts of marine debris.

Cross-Team Goal

The goal of this initiative is to assess, reduce, prevent, and eliminate marine debris and aquatic trash in the Gulf of Mexico and its watershed for the benefit of habitats, wildlife and fisheries, humans, and the Gulf economy.

Actions

- Assess and reduce the impacts of marine debris and aquatic trash through research, monitoring, and innovative solutions
- Support the removal of marine debris and aquatic trash to reduce impacts to habitats, wildlife and fisheries, navigational safety, humans, and the economy
- Prevent the introduction of marine debris and aquatic trash through raising awareness and improving individual stewardship through promoting local, regional and national coastal and river cleanups
- Work across Gulf of Mexico Alliance Priority Issue Teams to ensure maximum collaboration and holistic approaches to marine debris and aquatic trash projects and programs

Why Do This?

Marine debris is harmful to the Gulf of Mexico's ecosystems and economy, and affects fishing, navigation and even human health. Because marine debris is often the result of deliberate or accidental actions by people on land or at sea, it is a problem that each individual citizen can help prevent.

Expected Results

Marine debris is significantly reduced as a result of greater public education and outreach; partnerships with local governments, communities, and industry; and enhanced research, monitoring, and source identification.

Conservation, Restoration, and Resilience Planning

Cross-Team Initiative

The interdependencies between the human and natural environments are rarely accounted for in the development of plans or planning tools, which have historically focused on one or the other. To help facilitate better communication between the activities, the Gulf of Mexico Alliance will serve as a coordination point around which relevant conservation, restoration, socio-economic, and resiliency data and tools can be developed and managed to inform the decision-making of the wide array of stakeholders across the Gulf Coast.

Cross-Team Goal

The goal of this cross-team initiative is to foster greater integration among planning aspects of restoration, conservation, and resiliency to increase the efficiency and effectiveness of on the ground efforts.

Actions

- Coordinate existing conservation, restoration, and resiliency datasets to assist Gulf stakeholders in the drafting of a comprehensive adaptation and resilience plan
- Deliver priority datasets of landscape drivers and response actions to resiliency, conservation, and restoration planning managers
- Host workshops and practitioners forums for local communities on the application of science-based criteria to identify and prioritize conservation, restoration, and resiliency projects
- Use wetlands dynamics models to demonstrate the ecological impacts of projected sea level rise on estuarine systems to communities
- Promote consistent outputs from local community tools to assist regional planning and assessment

Why Do This?

There is a strong relationship between human activities in the Gulf coastal zone that underlie both human and natural system resiliency planning. Human resilience, natural habitat conservation, and restoration planners need a platform to discuss integrating natural habitats with human use so that the interdependencies of both are realized and planning efforts can be coordinated.

Expected Results

Human resilience, natural habitat conservation, and restoration planners interact with one another and are informed by a robust set of historical and predictive data from both sectors.

A Path Forward

Toward A Healthier Gulf

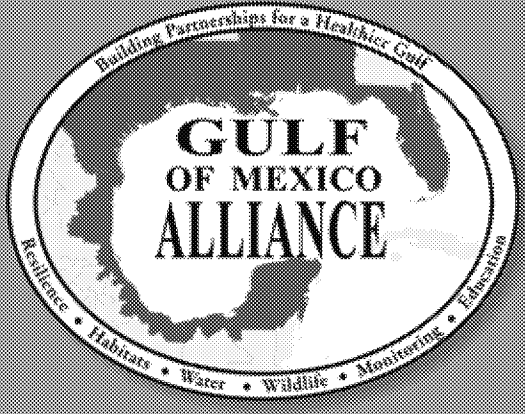
The Gulf of Mexico Alliance provides a strong foundation for long-term regional collaboration. Since 2006, the Alliance worked hard to realize the objectives outlined in the prior Governors' Action Plans, and this success has bred unprecedented trust and partnership. As a result, people from across the Gulf are eager to contribute to the work of the Alliance and its Priority Issue Teams. *Action Plan III* provides an opportunity to continue the culture of cooperation with renewed purpose and vitality.

Action Plan III is a reflection of a decade of experience addressing issues that directly affect the Gulf ecosystems and economies. The Gulf of Mexico Alliance has shown that it can restructure its priorities and organization to better serve the changing needs of the region. The teams' ability to come together across scientific and technical boundaries through the new cross-team initiatives are further evidence of the Alliance's evolution.

The Alliance is committed to a Gulf of Mexico region that includes healthy beaches, clean waters, productive marine ecosystems, and thriving resilient coastal communities. This vision is shared not only by the five Gulf States, but also by vital federal agencies, businesses, and non-governmental organizations. Achieving the goals of *Action Plan III* will take a coordinated effort, but history has shown that, working together, a healthy and resilient Gulf region is closer than ever.

"Action Plan III outlines priority areas to improve the health of the ecosystem and economy of the Gulf Coast region. Our investment in building working relationships among stakeholders will prove to be the backbone of ensuring success for a healthy Gulf."

– Ebonya Allen, Interim Director
U.S. EPA Gulf of Mexico Program



The mission of the Gulf of Mexico Alliance
is to enhance the ecological and
economic health of the Gulf of Mexico
through increased regional collaboration.

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